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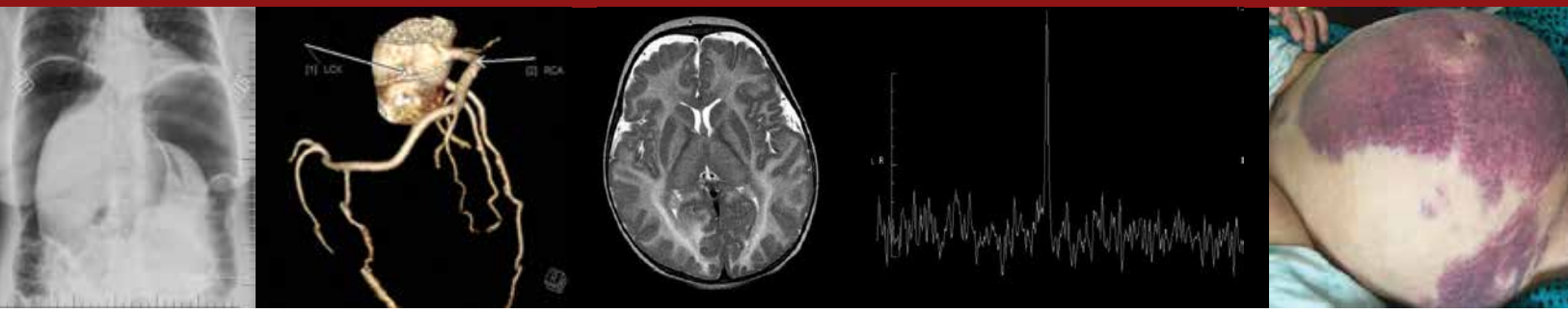

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Contents

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Original Article

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Investigation of Rapid Identification of Metisillin Resistance of Staphylococcus Aureus (MRSA) in Blood Culture Bottles at Three Different Pre-Incubation Periods

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BACKGROUND/AIMS
The aim of this study was to determine the early signal of methicillin-resistant Staphylococcus aureus (MRSA) growth in blood culture bottles.

MATERIALS and METHODS
The MRSA infections should be determined specially for the hospitalized patients to decrease the rates of mortality and morbidity. 19 MRSA isolates were included in the study. Strains were identified using the Phoenix 100 system (Becton-Dickinson Diagnostic Systems, Sparks, MD, USA). Three pre incubation grades were analysis: group I: 4°C, group II: 25°C, and group III: 37°C. Blood culture bottles were pre-incubated for 24 hours prior to the inoculation with MRSA. Contaminated bottles were incubated in the Bactec 3D Alert (Becton-Dickinson Diagnostic Systems, Sparks, MD, USA).

RESULTS
As indicated by the three different pre-incubation groups, the initial signals were detected at 37°C. The MRSA were grown for 12 hours in 37°C blood culture bottles.

CONCLUSION
Blood culture bottles which thermostatized at 37°C during 24 hours could give the early signal to determine the MRSA.

Keywords: Blood culture, incubation, storage

INTRODUCTION

Staphylococcus aureus is a commensal organism that lives on the skin, upper respiratory system, lower urogenital system, and digestive system in human (1). In 1930, methicillin was initially used for therapeutic treatment, and after 1 year, "methicillin-resistant *S. aureus* (MRSA)" were identified (1). Studies indicated that hospital infections due to MRSA had higher mortality rates than other hospital infections. Nowadays, most of the studies are based on this fact.

In blood infections, the identification of the isolated microorganisms and results of the antibiotic susceptibilities should be analyzed as soon as possible and results should be given to clinicians. Although new technology has been developed for the identification of the microorganisms associated with bacteremia and fungemia, the blood culture system remains the most reliable and practical method (2), as most of the hospitals and laboratories use blood culture systems.

The aim of the study to determine the time of detection (TTD) of an early signal of MRSA growth in blood culture bottles pre-incubated at different temperatures (4°C, 25°C, and 37°C) within 24 hours of inoculation with MRSA strains.

This study was presented in Infectious Disease Workshop, March 20-23, 2014, Ankara, Turkey.
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MATERIALS/PATIENTS AND METHODS

19 MRSA strains were included in the study from the Microbiology Laboratory of the University Hospital using the Phoenix 100 (Becton Dickinson Diagnostic Systems, Sparks, MD, USA) system. Three pre-incubation temperatures were assigned: group I: 4°C, group II: 25°C, and group III: 37°C. Blood culture bottles were pre-incubated 24 hours before inoculation with MRSA strains. Each group included the blood culture bottles inoculated with MRSA and one non-contaminated bottle as a negative control. The MRSA strains were resuspended in brain heart infusion broth according to the McFarland 0.5 turbidity. Ten milliliters of MRSA suspension was added in each blood culture bottle. Both inoculated and negative control bottle were incubated in the Bactec 3D Alert system (Becton–Dickinson Diagnostic Systems, Sparks, MD, USA). The values for the TTD rates were correlated with the pre-incubation time and storage temperature. Since this study was laboratory based study, we did not use any human materials. So ethic committee and informed consent aren't necessary. This study was performed in accordance with the principles of Declaration of Helsinki.

Statistical Analysis

The SPSS(Statistical Package for Social Sciences) software program version 3.0 (SPSS Inc.; Chicago, IL, USA) was used for statistical analyses. Variation analysis (ANOVA) was used for mean differences. Data were expressed as a mean value (standard deviation), minimum-maximum, and percentage where appropriate. A p value of <0.05 was considered statistically significant.

RESULTS

Depending on the three different pre-incubation groups, the early signals were seen at the 37°C (ANOVA, Tukey's multiple comparison test, F=8.927, dF=6.084; **p<0.05). No statistical relation was noted between pre-incubation at 4°C and 25°C (p>0.05) (Figure 1)

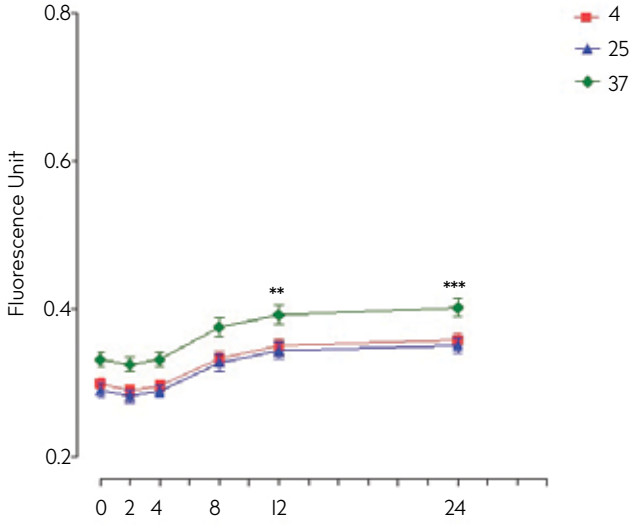

FIGURE 1. The time of detection of three different pre-incubated blood culture bottles (ANOVA, Tukey's multiple comparison test, F=8.927, dF=6.084, p<0.001).

DISCUSSION

One of the main reasons for morbidity and mortality in hospitalized patients is blood stream infections (3). Various studies have shown that the mortality rates associated with bacteremia were 20%–50% (4). Therefore, the essential mission of the clinical microbiology laboratory is the correct interpretation and the earliest reporting of the blood culture results (3).

S. aureus is the most frequently isolated organism among the gram-positive bacteria in bacteremia (2). The most frequently isolated microorganisms in Turkey are *Escherichia coli* and the coagulase-negative Staphylococcus (CNS) (4). In a previous study performed in our laboratory (still in press), from a total of 454 blood cultures, 50 (11.01%) were culture positive. Among the positive cultures, 41 (82%) were gram-positive and 9 (18%) were gram-negative bacteria. The most frequently isolated gram-positive bacteria were *S. aureus*, (24.39%) and *S. hominis* (24.39%). oxacillin resistance was 82.93% in all *Staphylococcus* species.

Depending on the results from the three pre-incubation groups, TTD were seen at the 37°C blood culture bottles. MRSA growth were observed after 12 hours of incubation in bottles which pre-incubated at 37°C (ANOVA, Tukey's multiple comparison test, F=8.927, dF=6.084; **p<0.01, ***p<0.001; Figure 1).

Koh et al. (5) indicated that the blood culture bottles that were pre-incubated at 37°C during the night ensure earlier final reports. Also, Lee et al. (6) reported that TTD was influenced by the pre-incubation temperature and duration rather than the colony-forming unit quality or bottle type. The prevalence of MRSA infections varies between countries. Scandinavia and the Netherlands have a low prevelance of MRSA infections, however in the USA, the prevelance of MRSA infections was 25% although Canada the prevelance rate was less than 5% (7). In Turkey, the prevalence of MRSA is >30% (8). Türk Dağı et al. (9) reported that the prevalence of MRSA infections was 42.5% in blood cultures. Earliest identification of MRSA are important for blood culture infections (3). The average reproduction time of the gram-positive and negative bacteria and yeasts is 18-19 hours, 15-19 hours, and 23-41 hours, respectively (10). Although, molecular techniques, such as nucleic acid probes and polymerase chain reaction (PCR), are used for rapid detection, the blood culture systems remain the most reliable and sensitive (3). Molecular tests that can be used include FISH, real-time PCR, MALDI-TOF and PNA-FISH (11).

Seegmüller et al. (12) reported that *Haemophilus influenzae, S. pneumoniae, Enterobacteriaceae, S. aureus, Enterococcus faecalis*, and *Candida glabrata* had similar sensitivity between pre-incubation of blood culture bottles at room temperature and at 36°C (12). Akan et al. (13) reported that if the blood culture processing step was delayed, the bottles may be stored at 22°C. According to the present study results, the blood culture bottles might be pre-incubated at 37°C for 12 hours to rapidly identify bacteremia. If we reduce the reproduction time of the MRSA detection, the clinician can be notified of the infection without delay. On the other hand, the storage of blood culture bottles recommended by the firm at 4°C. Further studies will be needed to focus on If the medium into the blood culture bottles will be affected at during 24 hours at 37°C."

Ethics Committee Approval: This study was laboratory based study. We did not use any human materials.

Informed Consent: N/A

Peer-review: Externally peer-reviewed.

Author contributions: Concept - M.G., K.S.; Design - M.G., K.S.; Supervision - K.S.; Resource -M.G.,K.S.; Materials - M.G.,E.G.; Data Collection and/or Processing - M.G., A.A., K.S.; Analysis and/or Interpretation - A.A., K.S., M.G.; Literature Search - M.G., E.G.; Writing - M.G., E.G.; Critical Reviews -K.S., A.A.

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Original Article

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Knowledge and Attitudes of Northern Cypriot Parents about Children Safety Carriage in Cars

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BACKGROUND
The purpose of the study was to assess the knowledge levels and attitudes of Northern Cypriot parents about child passenger safety and to determine the need for parental education regarding this issue.

MATERIALS and METHODS
This was a planned cross-sectional study. The questionnaire comprised two parts. The first part included five multiple-choice questions, which were used to evaluate the level of knowledge regarding child passenger safety according to the recommendations of the American Academy of Pediatrics. The second part was designed as a five-point Likert scale and included questions regarding the behavior and attitude of parents toward child passenger safety.

RESULTS
A total of 500 questionnaires were distributed and 377 participants responded, with a response rate of 75.4%. The mean±standard deviation score from the multiple-choice questions regarding knowledge about child passenger safety was 2.83±1.11. Only 17.4% of the parents with children aged 0-2 years knew that children should be placed in a rear-facing car seat at that age, 80% of parents of the children in the 2-6 years age group knew that the child should be placed in a forward-facing seat at that age, while only 39.3% of parents of children in the 6-12 years age group were aware that the child should be placed in a belt-positioning booster seat.

CONCLUSION
This study emphasized on the less knowledge and incorrect attitudes of parents about child restraint seat (CRS) in Northern Cyprus compared to those in the developed countries. The result highlights the urgent need for social and governmental programs about CRS in our country.

Keywords: Car safe, accident, children, Cyprus, parents

INTRODUCTION

According to the World Health Organization (WHO), "Every day around the world the lives of more than 2000 families are torn apart by the loss of a child to an unintentional injury or so-called 'accident' that could have been prevented." According to the WHO statistics, road traffic accident is the 2nd most commoncause for death among individualsaged 5-14 years and the most common reason for 14-19 years Road accidentis the eighth most common reason for losing children in all childhood period. This striking statistical data suggests that governments, social organizations, and health providers should educate families and improve laws about protection of their children from accidents. It is well documented that child safety seats reduce the injury risk by 71-82% (1, 2) and reduce death by 28% (3).

The policy statement of American Academy of Pediatrics (AAP) about the children restraint system to maximize safety of children passengers is based on four recommendations:

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I. Rear-facing car safety seats for most infants up to 2 years of age;
2. Forward-facing car safety seats for most children through 4 years of age;
3. Belt-positioning booster seats for most children through 8 years of age and
4. Lap-and-shoulder seat belts for all who have outgrown booster seats (4).

In Northern Cyprus (NC), child passenger safety regulations were added to the law in December 2012. This legal change was late and public was not enforced for this laws. The purpose of this study was to identify parental knowledge and attitude toward child passenger safety.

MATERIALS and METHODS

This was a planned cross-sectional study performed between March 2016 and May 2016. A self-structured questionnaire was prepared using Google Forms (Google Inc.; CA, New York, USA) and was distributed among the parents of pediatric patients who were admitted to Near East University Hospital. In addition, questionnaires were distributed among pregnant women and their partners during the routine obstetric follow-up. The survey was electronically distributed by sharing the link of the questionnaire with the respondent via email. Verbal consent was obtained from all individuals attending the survey.

The questionnaire consisted of two parts. The first part included five multiple-choice questions that were used to evaluate the level of knowledge about child passenger safety. The child passenger safety questions were prepared according to the recommendations of the AAP (4). Each correct answer was scored as one point.

The second part was designed as a five-point Likert scale and comprised questions regarding the behavior and attitude of parents toward child passenger safety.

Ethics committee approval was received for this study from the ethics committee of Near East University School of Medicine.

Statistical Analysis

Descriptive statistics for all demographic variables and survey questions were calculated. For categorical variables, frequency and percentage were calculated, while for continuous variables, arithmetic mean±standard deviations were calculated. The Kolmogorov-Smirnov normality test was applied to understand the distribution properties of the continuous variables. Depending on the results, the Student's t-test was applied for comparison of two-group hypothesis tests. For categorical variable comparisons, the Pearson Chi square or Fisher's exact test was applied. To investigate the possible associations between variables, the Spearman rank correlation analysis was performed. The level of significance was accepted as 0.05. All statistical calculations were performed with SPSS (SItaistical Package for Socie1 Sciences) 21.0 (IBM Corp.; Armonk, NY, USA) software.

RESULTS

A total of 500 questionnaires were distributed and 377 participants responded, with a response rate of 75.4%. There was a female predominance in the group (63.9%). Respondents were mostly in the 25-40 years age group (63.1%) and were highly educated (graduated more than university; 87.2%). Most of the respondents had an income of more than 1000 USD per month, which is nearly twice more than the minimum wage in NC. 87.5% of the respondents owned a vehicle (Table I).

The mean score from the multiple-choice questions regarding the knowledge of child passenger safety was 2.83±1.11 SD. Female respondents scored higher points than the male respondents, but there was no significant difference (p=0.125). Respon-

TABLE I. Demographic characteristics of participants

	Number	Percentage
Gender		
Male	136	36.1%
Female	241	63.9%
Age (years)		
18-24	44	11.7%
25-40	238	63.1%
41-59	84	22.3%
Over 60	11	2.9%
Education		
Primary school	7	1.9%
High school	41	10.9%
University	192	50.9%
Post-graduate	137	36.3%
Monthly income		
No income	57	15.1%
Under 1000 USD	132	35%
Over 1000 USD	188	49.9%
Number of children		
No children	95	25.2%
1	150	39.8%
2	116	30.8%
More than 3	16	4.2%
Vehicle possession		
Yes	330	87.5%
No	47	12.5%

USD: American dollar

TABLE 2. Comparison of scores of knowledge level of the respondents according to gender, having children, and possession of a vehicle

	Mean±SD	p value
Male	2.71±1.21	0.125
Female	2.90±1.10	
Child +	2.89±1.10	0.04
Child -	2.64±1.12	
Car owner +	2.84±1.11	0.585
Car owner -	2.74±1.09	

TABLE 3. Correct answers of parents about carrying method of their children according to age groups of children

Age intervals of participants' children (years)	Questions about carrying method of children	Number of respondents with correct answers	Total	Percentage
0-2	When to start using CRS?	74	103	72%
	Rear-facing seats	18	103	17.4%
2-6	Forward-facing seats	98	122	80%
6-12	Belt-positioning booster seats	35	89	39.3%

CRS: child restraint seat

TABLE 4. Parents' behavior and attitude toward child passenger safety (Likert scale: 1 strongly disagree, 5 strongly agree)

Behavior and attitude questions	Likert scale points distribution (percentage)					
	1	2	3	4	5	Mean±SD
While unsafe drive	11(2.0)	2 (0.5)	8 (2.1)	47(12.5)	309 (82)	4.7±0.79
While safe drive (long distance)	47 (12.5)	72 (19.1)	82 (21.8)	66 (77.5)	110 (29.2)	3.0±1.15
While safe drive (short distance)	14 (3.7)	39 (10.3)	72 (19.1)	98 (26)	154 (40.8)	3.32±1.39
During stop at traffic lights	73 (19.4)	83 (22)	78 (20.7)	54 (14.3)	89 (23.6)	3.01±1.45
I don't accept keeping my child back seat alone	150 (39.8)	36 (9.5)	43 (11.4)	34 (9)	114 (30.2)	2.8±1.71
I feel anxious about leaving child sitting alone in CRS in the rear seat	323 (85.7)	13 (3.4)	15 (4)	6 (1.6)	20 (5.3)	1.37±1.02
Child can travel on adult lap on rear seat	289 (76.7)	30 (8)	28 (7.4)	11 (2.9)	19 (5)	1.52±1.09
CRS is a waste of money	308 (81.7)	21 (5.6)	22 (5.8)	3 (0.8)	23 (6.1)	1.44±1.07
I got information about car safety seat easily	43 (11.4)	31 (8.2)	98 (26)	67 (17.8)	138 (36.6)	3.6±1.35
Parents should be role model for children	12 (3.2)	2 (0.5)	10 (2.7)	37 (9.8)	316 (83.8)	4.71±0.82
Child passenger safety rules are not negotiable	25 (6.6)	3 (0.8)	10 (2.7)	31 (8.2)	308 (81.7)	4.58±1.07
We are informed enough about children safety car seat	120 (31.8)	83 (22)	101 (26.8)	30 (8)	43 (11.4)	2.45±1.32
Governmental organizations spend enough effort on child passenger safety	188 (49.9)	94 (24.9)	56 (14.9)	11 (2.9)	28 (7.4)	1.93±1.19

CRS: child restraint seat

TABLE 5. Correlation coefficients between perception of child vulnerability against traffic accidents with age, income, education level, and fastening of seat belts (*p<0.05)

	Fastening of seat belt	While unsafe drive	While safe drive (long distance)	While safe drive (short distance)	During stop at traffic lights
Fastening of seat belt		0.270*	0.214*	0.123*	0.103*
Education level	0.190*	0.023	0.242*	0,061	0.116*
Income	0.168*	0.063	0.164*	0.057	0.089
Age	0.222*	0.123*	0.194*	0.157*	0.108*

dents who owned a vehicle scored higher points compared to their counterparts without significant statistical difference (p=0.585). Respondents who had children scored significantly higher points than those without children (p<0.05; Table 2).

The participants having children were also evaluated for correct answers to the questions regarding child transportation in the vehicle according to age. Although only 17.4% of parents with children aged 0-2 years knew that at that age, children should be placed in a rear-facing car seat, 72% of them were aware that a child should be transported in a car seat starting from birth. In addition, 80% of parents of the children in the 2-6 year age group knew that at that age, the child should be placed in a forward-facing seat, while only 39.3% of the parents with children in the 6-12 age group were aware that the child had to be placed in a belt-positioning bolster seat (Table 3).

The attitude of respondents toward child restraint seat (CRS) was positive; most of them agreed that child passenger safety rules are not negotiable, keeping child alone and restrained in the back seat is not a great issue, and parents should be role models for children regarding transportation safety. In addition, more than a half of the respondents claimed that they reached the information about the car seats safety easily. Most of the respondents objected the traveling of the child on the lap of the adult at the back seat and do not believe that the car seat is a waste of money.

However, a great majority of the respondents have thought that governmental organizations are not taking enough efforts to inform people about child passenger safety (Table 4). The television has been chosen as the most preferred means of providing information about child passenger safety by the government (52.8%), followed by social media (18%), and billboards (13.8%).

The perception of respondents about vulnerability of the child against traffic accidents is listed in Table 5. The question was "When do you think a child is most vulnerable to a traffic accident?" and the respondents were asked to attempt the 5point Likert scale questionnaire. The normal expectation was to give high points to all instances, such as unsafe drive, short distance safe drive, long distance safe drive, and stop at traffic lights. The perception about child vulnerability in different driving scenarios showed positive correlation with age, income, and education level with statistical significance at many instances. At the same time, the respondents who fastened seat belts themselves showed strong and significant positive correlations about child vulnerability in all driving scenarios (Table 5).

DISCUSSION

Traffic accidents are one of the most important problems of NC, because safety and infrastructure of roads are not satisfactory. The death ratio depending on 100,000 cars population is 14.6, and the death ratio in 100,000 cars was reported as 16 in NC. On the contrary, those ratios were 3 and 6 in the United Kingdom (UK) and a mean of 5.7 and 11, respectively, in the European Union (EU) (5). These results show that the death risk is clearly very high in NC, compared to the EU and UK, which emphasizes the urgency of preventive strategies, such as education of families and improvement of the laws about safety transportation.

According to the world report on child injury prevention by the WHO, approximately 262,000 children died because of road traffic injuries, and this high ratio was almost 30% percent of all injury deaths among children. Unfortunately, road traffic injuries are also one of the leading causes of children disability (6). Therefore, the protection of children from accidents, death, and disability is very important. One of the ways to protect children from accidents is carrying them safely in our cars with the appropriate use of CRS according to regulations of AAP. A child correctly and safely carried in a car was reported 2.7 times more likely to survive after car accident (7).

The aims of this current study were to describe the knowledge levels, attitude, and the effect of psychosocial and demographic characteristics of Turkish Cypriot parents regarding child passenger safety. Unfortunately, our results emphasized intermediate to low correct knowledge and attitude about using CRS correctly in participants with lower and higher education, and high income. This study was conducted 4 years after the CRS laws were implemented in NC, and it is the first study in NC investigating families' knowledge and attitudes toward CRS.

Although parents accept the CRS safely for their children, the CRS is misused according to the current study; 30% percent of the participants who have children younger than 2 years did not start using CRS after birth and only 17.4% of them used rear-facing seats. Moreover, 20% of participants who have children between 2-6 years of age do not use seats, and only 39.3% of families who have children >6 years carried them correctly. Unfortunately, the correct answer ratios were extremely lower than those reported in previous studies (8-12). These results emphasize the urgency of the distribution of public information programs, particularly among those who have children aged <2 years. Only 7.4% of the participants could reach information on CRS easily, while 11.4% believed that governmental organizations spend enough effort to improve knowledge about CRS. Our results also suggest that national child injury prevention strategies in NC focusing on family education should start during pregnancy. Moreover, almost 40% of participants were not reluctant to keep their child at the back seat alone. This may be the most important factor that affected our participants' attitude who had children aged <2 years. In addition, more than half of the participants preferred television for this social program, and 18% of them preferred social media. The aim of the programs should focus on correct information on CRS, changing the beliefs and attitudes.

The trauma risk for children during accidents was accepted lower during safe long distance and during stop at traffic lights among participants. According to the WHO car crash report, a 1 km/h increase in speed raises the risk of serious and fatal injuries by 5% (6). However, our participants believed that the lowest risk was involved in long drives. In contrast, participants who fasten seat belts, had higher educational level, more income, and were older always considered their children vulnerable to traffic accidents.

In conclusion, this study emphasized that, parents have lower knowledge and un-correct attitudes about CRS of parents in NC compared to developed countries (10, 13-15). This result highlights the urgent need for social and governmental programs about child passenger safety in our country, including television programs or advertisements, which were the most preferred way for this population.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Near East University School of Medicine.

Informed Consent: Verbal informed consent was obtained from parents of the patients who participated in this study.

Peer-review: Externally peer-reviewed.

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Original Article

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Risk Factors Associated with Intimate Partner Violence during Pregnancy in Northern Cyprus

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BACKGROUND
To estimate the risk factors associated with intimate partner violence during pregnancy in Northern Cyprus.

MATERIALS and METHODS
This cross-sectional study was performed between February 2015 and April 2015. An approval from the ethics committee was obtained prior to the study. A self-structured face-to-face survey was conducted among pregnant women who were admitted to the Obstetrics Department of the university hospital. The first part of the survey was related to the sociodemographic characteristics of the participants and their partners. The second part comprised questions about the relationship type of the respondents and obstetric characteristics. The third part consisted of set of 5 groups and each group included questions specific to the type of the related violent behavior.

RESULTS
The questionnaire was offered to 231 pregnant women, and 219 of them agreed to participate, resulting in a response rate of 94.8%. The prevalence of overall violence before the pregnancy was 75.3%, and it decreased to 68% during pregnancy, which was statistically significant ($p<0.001$). The overall violence during pregnancy was significantly associated with multiparity, unplanned pregnancy and marriage type.

CONCLUSION
Although decreasing, violence against women continues during pregnancy.

Keywords: Pregnancy, violence, nursing

INTRODUCTION

Violence against women is an infringement of the fundamental human rights resulting from unequal power in the relationship between men and women. A World Health Organization report that was released in 2013 states that 15-71% of women are exposed to violence on a global scale. Violence is not restricted only by the physical type; verbal, sexual, emotional, and economic violence are also present and conducted against women. Physical violence is described as slapping, punching, kicking, arm twisting, strangling, choking, stabbing, threatening with an object or weapon, suppression, and beating. Verbal violence presents as insult, humiliation, and mocking; sexual violence is defined as sexual assault, rape, sexual harassment, and forced sexual intercourse. Emotional violence is referred to ignoring love, compassion and support, confinement to the home, and isolation. Economic violence includes restriction to financial access, seizure of incomes or savings, control over partner expenditures, refusal to contribute financially, and controlling the access to healthcare and employment (1,2). Unfortunately, intimate partner violence (IPV) is shown to be continuing during the pregnancy, with an estimated prevalence of 0.9-20.1% in literature (3). Physical violence during pregnancy may lead to prenatal bleeding, premature separation of placenta, premature birth, miscarriage, and other prenatal and postnatal morbidities (4-9). Moreover, exposure to violent behavior may lead to maternal psychological disturbances both in the perinatal and postnatal periods (10, 11).

Many studies have been conducted worldwide, but there is no study regarding IPV during pregnancy in Northern Cyprus. We aimed to estimate the types of violence and the risk factors associated with IPV against women in Northern Cyprus.

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MATERIALS and METHODS

This cross-sectional study was performed between February 2015 and April 2015. Approval from the ethics committee was obtained prior to the study. A self-structured face-to-face survey was conducted among pregnant women who were admitted to the Department of Obstetrics the university hospital. The confidentiality of the respondents was ensured and questionnaire was applied in a private interview room. Written consent was obtained from respondents before application. A questionnaire developed by researchers was used. The first part of the questionnaire was related to the sociodemographic characteristics of the participants and their partners (respondent's and their partners' age, education, employment status, family monthly income, living with partner's family, area of residence, and partner's substance abuse). The second part comprised questions about the relationship type of the respondents and the obstetric characteristics while attempting the questionnaire (number of pregnancies, pregnancy trimester, planning of the pregnancy, and partner's satisfaction with the child's gender, marriage type, marriage duration, and relationship score). The third part consisted of 5 groups sets and each group included questions specific to the type of the related violent behavior (physical, verbal, economic, sexual, and emotional). The variables in the first and second parts were accepted as independent, and the variables in the third part were accepted as dependent. The questions were designed to be straightforward, such as "Did your partner slap you before/during pregnancy?" or "Did your partner force you to have sexual intercourse against your will before/during pregnancy?" Overall violence is described as at least one attack of any type of violence throughout a described period.

Descriptive statistics for all variables were calculated and are provided throughout the text. For categorical variables, frequency and percentage information were given while for the continuous variables arithmetic mean, standard deviation, median, minimum and maximum were calculated. The Kolmogorov-Smirnov test of normality was applied to understand the distribution characteristics. Since the data did not satisfy parametric assumptions, the Mann-Whitney U-test was used to compare the distribution of continuous variables between two independent groups. Either the Pearson Chi square or Fisher's exact test was applied for evaluating the association among categorical variables. For comparing pre- and post-pregnancy findings, the McNemar test was used. All statistical calculations were performed using the SPSS (Statistical Package for the Social Sciences) Demo Version 22.0 (IBM Corp.; Armonk, NY, USA) Statistics for Macintosh package. The level of significance was set at 0.05.

RESULTS

The questionnaire was offered to 231 pregnant women, and 219 of them agreed to participate, resulting in a response rate of 94.8%. The sociodemographic characteristics of the respondents are summarized in Table I. The mean age of the respondents was 28.3±4.3 years, and the mean age of their partners was 31.1±4.3 years. Most of the respondents and their partners had at least high school education (88.1% and 90%, respectively), and 52.1% of the women were unemployed. Majority of the respondents' partners were employed (99.1%). The family's monthly income-expenditure balance was equal in most families (62.6%). Among the respondents, 75.3% lived in urban area. Pregnancy was planned in 81.3% of the cases, and it was the first pregnancy in 53.4% of the respondents. The distribution of the pregnancy trimesters was even; 28.8% of the respondents were in the first, 31.9% were in the second, and 39.3% were in the third trimester (Table I). The partners had an addiction (drug, alcohol, or tobacco) in 35.2% of the cases. Only 2.7% of the partners were displeased with the child's gender.

TABLE I. Sociodemographic characteristics of pregnant women

Age	n (%)
Under 25 years	60 (27.4)
26–30 years	92 (42.0)
Over 31 years	67 (30.6)
Education	n (%)
Primary school	26 (11.9)
High school	64 (29.2)
Higher education	129 (58.9)
Employment	n (%)
Employed	105 (47.9)
Unemployed	104 (52.1)
Residence	n (%)
Urban	165 (75.3)
Rural	54 (24.7)
Monthly Income	n (%)
Negative balance	44 (20.1)
Neutral balance	137 (62.6)
Positive balance	38 (17.4)
Marriage Type	n (%)
Normal Marriage	202 (92.2)
Arranged Marriage	17 (7.8)
Trimester	n (%)
1	63 (28.8)
2	70 (32.0)
3	86 (39.3)
Pregnancy planning	n (%)
Planned	178 (81.3)
Unplanned	41 (18.7)

TABLE 2. Distribution between the types of intimate partner violence before and during the pregnancy (*p<0.05)

Violence Types n: 219	Before Pregnancy n (%)	During Pregnancy n (%)	*p
Emotional	34 (15.5)	28 (12.8)	0.210
Verbal	141 (64.4)	123 (56.2)	0.001*
Sexual	16 (7.3)	16 (7.3)	1.000
Physical	4 (1.8)	2 (0.9)	0.500
Economic	81 (37.0)	73 (33.3)	0.080
Overall violence*	165 (75.3)	149 (68.0)	0.001*

TABLE 3. Distribution of violence types before pregnancy according to the demographic characteristics of the respondents and their partners (*p<0.05)

	Type of violence				
	Emotional n (%)	Verbal n (%)	Sexual n (%)	Physical n (%)	Economic n (%)
Age					
Under 25 years	8 (13.3)	34 (56.7)	4 (6.7)	2 (3.3)	28 (46.7)
26-30 years	12 (13)	56 (60.9)	6 (6.5)	2 (2.2)	28 (30.4)
Over 31 years	14 (20.9)	51 (76.1) * p (0.048)	6 (9)	0 (0)	25 (37.3)
Education					
Primary school	11 (42.3) * p (0.000)	16 (61.5)	5 (19.2)	2 (7.7)	15 (57.7) * p (0.018)
High school	13 (20.3)	49 (76.6)	6 (9.4)	2 (3.1)	27 (42.2)
Higher education	10 (7.8)	76 (58.9)	5 (3.9)	0 (0)	39 (30.2)
Partner's Education					
Primary school	12 (54.5) * p (0.000)	21 (95.5) * p (0.005)	10 (45.5)	0 (0)	15 (68.2) * p (0.001)
High school	9 (16.1)	36 (64.3)	2 (3.6)	3 (5.4)	25 (44.6)
Higher education	13 (9.2)	84 (59.6)	4 (2.8)	1 (0.7)	41 (29.1)
Employment					
Employed	18 (17.1)	67 (63.8)	8 (7.6)	2 (1.9)	34 (32.4)
Unemployed	16 (14)	74 (64.9)	8 (7)	2 (1.8)	47 (41.2)
Residence					
Urban	19 (11.5)	104 (63)	11 (6.7)	2 (1.2)	59 (35.8)
Rural	15 (27.8) * p (0.004)	37 (68.5)	5 (9.3)	2 (3.7)	22 (40.7)
Income					
Negative balance	11 (25)	29 (65.9)	9 (20.5)	2 (4.5)	23 (52.3)
Neutral balance	17 (12.4)	87 (63.5)	6 (4.4)	0 (0)	46 (33.6)
Positive balance	6 (15.8)	25 (65.8)	1 (2.6)	2 (5.3)	12 (31.6)
Marriage Type					
Normal Marriage	21 (10.4)	125 (61.9)	10 (5.0)	3 (1.5)	68 (33.7)
Arranged Marriage	13 (76.5) * p (0.000)	16 (94.1) * p (0.008)	6 (35.3) * p (0.000)	1 (5.9)	13 (76.5) * p (0.000)

The prevalence of overall violence before the pregnancy was 75.3%, and it decreased to 68% during pregnancy, which was statistically significant (p<0.001; Table 2). The overall violence before pregnancy was significantly associated with multiparity (p<0.001), marriage type (p=0.008), women's educational status (p=0.004), and their partners' educational status (p=0.002). The overall violence during pregnancy was significantly associated with multiparity (p=0.02), unplanned pregnancy (p=0.023), and marriage type (p=0.016).

The distribution of violence types before and during pregnancy is listed in Table 2. The most anticipated types of IPV before pregnancy were verbal (64.4%) and economic (37%). The same types of violence were encountered during pregnancy (verbal: 56.2% and economic: 33.3%). The decrease in the prevalence of the verbal violence during pregnancy was statistically significant (p<0.001). The other types of the violence also showed a decrease during pregnancy but the difference was statistically insignificant (p>0.05).

Emotional violence before pregnancy was significantly associated with the educational status, partner's education, rural residence, and type of the marriage. Verbal violence before pregnancy was related to the woman's age, partner's education, and marriage type. Sexual violence was significantly associated with marriage type. Economic violence was significantly associated with education, partner's education, and marriage type. There was no statistically significant association between sexual violence and demographic properties before pregnancy (p>0.05; Table 3).

During pregnancy, emotional violence was significantly associated with education, partner's education, rural residence, and income (p<0.05). Verbal violence was associated with educa-

TABLE 4. Distribution of violence types during the pregnancy according to the demographic characteristics of the respondents and their partners (*p<0.05)

	Type of violence				
	Emotional n (%)	Verbal n (%)	Sexual n (%)	Physical n (%)	Economic n (%)
Age					
Under 25 years	6 (10)	30 (50)	4 (6.7)	1 (1.7)	22 (36.7)
26-30 years	9 (9.8)	51 (55.4)	5 (5.4)	1 (1.1)	27 (29.3)
Over 31 years	13 (19.4)	42 (62.7)	7 (10.4)	0 (0)	24 (35.8)
Education					
Primary school	9 (34.6) *	12 (46.2)	6 (23.1)	0 (0)	11 (42.3)
	p (0.001)				
High school	9 (14.1)	45 (70.3) *	6 (9.4)	2 (3.1)	24 (37.5)
		p (0.023)			
Higher education	10 (7.8)	66 (51.2)	4 (3.1)	0 (0)	38 (29.5)
Partner's education					
Primary school	10 (45.5) *	17 (77.3)	11 (50.0)	0 (0)	11 (50.0)
	p (0.000)				
High school	5 (8.9)	32 (57.1)	1 (1.8)	1 (1.8)	21 (57.1)
Higher education	13 (9.2)	74 (52.5)	4 (2.8)	1 (0.7)	41 (29.1)
Employment					
Employed	14 (13.3)	58 (55.2)	8 (7.6)	1 (1)	32 (30.5)
Unemployed	14 (12.3)	65 (57)	8 (7)	1 (0.9)	41 (36)
Residence					
Urban	14 (8.5)	91 (55.2)	10 (6.1)	1 (0.6)	53 (32.1)
Rural	14 (25.9) *	32 (59.3)	6 (11.1)	1 (1.9)	20 (37)
	p (0.001)				
Income					
Negative balance	12 (27.3) *	25 (56.8)	8 (18.2)	2 (4.5)	20 (45.5)
	p (0.002)				
Neutral balance	15 (10.9)	78 (56.9)	7 (5.1)	0 (0)	42 (30.7)
Positive balance	1 (2.6)	20 (52.6)	1 (2.6)	0 (0)	11 (28.9)
Trimester					
1	9 (14.3)	31 (49.2)	4 (6.3)	1 (1.6)	20 (31.7)
2	12 (17.1)	43 (61.4)	8 (11.4)	1 (1.4)	23 (32.9)
3	7 (8.1)	49 (57)	4 (4.7)	0 (0)	30 (34.9)
Pregnancy planning					
Planned	23 (12.9)	93 (52.2)	13 (7.3)	1 (0.6)	56 (31.5)
Unplanned	5 (12.2)	30 (73.2) *	3 (7.3)	1 (2.4)	17 (41.5)
		p (0.015)			
Marriage type					
Normal Marriage	19 (9.4)	109 (54.0)	10 (5.0)	1 (0.5)	63 (31.2)
Arranged Marriage	9 (52.9)	14 (82.4) *	6 (35.3) *	1 (5.9)	10 (58.8) *
		p (0.023)	p (0.000)		p (0.020)

tion, pregnancy planning, and marriage type. Both sexual and economic violence was found to be statistically significant with marriage type (p<0.05; Table 4).

Also, there were several significant correlations between verbal violence and multiparity both before and during pregnancy (p=0.02 and p=0.011, respectively). In addition, emotional violence during pregnancy was significantly related to living with the partner's family (p=0.011), living without an official marriage (p=0.044), and partner's dissatisfaction with the child's gender (p<0.001). These findings are not shown in the tables.

The respondents were also asked to score their relationship with their partner from 1 (very bad) to 10 (very good). The mean relationship score was 9.04±1.29. The overall violence and all the violence subtypes were significantly associated with lower relationship scores ($p<0.001$) both before and during pregnancy.

DISCUSSION

IPV against the women is a serious problem mostly arising from sexual inequality and discrimination. Pregnancy, one of the most emotional periods in a family's life, unfortunately fails to act as a protection against the violence.

This is the first study regarding IPV during pregnancy in Northern Cyprus. The overall prevalence of IPV was 75.3% before pregnancy and 68.0% during pregnancy. The most frequent types of violence during pregnancy were verbal (56.2%) and economic (33.3%), followed by emotional (12.8%), sexual (7.3%), and physical (0.9%). A study performed by Çakıcı et al. (12) in Northern Cyprus in 2007 showed that the overall emotional violence against women was 86.3%, sexual violence was 29.6%, and physical violence was 9.6%. A higher prevalence of verbal, emotional, and economic violence than of other types can be related to women's more comfortable expression of these types of violence. However, it is also known that these types of violence are more common. In our study, factors, such as low educational status of the women and their spouses, living in the rural areas, arranged marriage, living without an official marriage, low income, multiparity, unplanned pregnancies, and dissatisfaction with the sex of the baby had significant association with different types of violence both before and during pregnancy. Cripe et al. (13) conducted a study among 2167 women and showed that unplanned pregnancies increased the prevalence of physical violence. Another study performed in Peru by Perales et al. (14) showed that living without an official marriage and being economically dependent and uneducated increased the exposure to both gestational and lifelong violence. Farrokh-Eslamlou et al. (15) found that 55.9% of the pregnant women were exposed to violence; low education level, unemployment of partners, and multiparity increased the prevalence.

It is believed that the low level of education of women, their marital status, and the lack of certain income render them weak and dependent on men, thus increasing violence. The cause of ongoing violence in pregnancy may be because of the negative thoughts and behaviors of the male partner against the child to be born in unwanted pregnancies. Moreover, male-dominated societies may have less value for women and have gender-oriented discrimination in favor of boys, which may also increase violence.

Perhaps, one of the most interesting findings of our work was the unexpectedly high relationship scores despite high prevalence of IPV. The high mean relationship scores with exposure to violence suggest that our respondents did not perceive emotional, verbal, or economic violence as violence, or probably, they just ignored the violence. Women should not be only perceptive to physical violence, it may cause them not to take precautions to reduce the other types of violence. This is also the basis for the development of physical violence (16).

Some studies show that contrary to contemplation, pregnancy increases the violence. Finnbogadottir et al. (17) showed that violence increased with the progression of pregnancy and the postpartum period. In 2012, Arslantas et al. (18) found that women who had a primary school or lower education level and had an unwanted marriage were exposed to more violence during pregnancy. In addition, in a study among 500 women, Mahenge et al. (19) showed that women were exposed to more violence during pregnancy than in the postpartum period.

In our study, pregnancy was found to be a factor reducing the overall rate of violence. Kataoka et al. (20) reported that physical violence in pregnancy significantly decreased, although women who had experienced pre-pregnancy violence continued to experience violence in pregnancy. Bagcioglu et al. (21) showed that 47.3% of women were exposed to violence before pregnancy, and this rate decreased to 10.3% during pregnancy. Considering the aforementioned studies, it is noted that the ongoing violence in pregnancy decreased significantly but not completely. The variability between studies regarding increase or decrease of violence during the pregnancy may be because of the value given to pregnancy and the pregnant woman in different societies.

While the study data was being collected, 12 of the participants did not agree to participate in the study. A few of those who agreed to participate were reluctant and asked where and how we would attempt the questionnaire. They agreed to participate in the work with an assurance of secrecy. We think that shame, fear, unwillingness to talk about violence, and the worry that the partner and family will be aware contributed to the rejection of participation.

Although being a reference center in the region, the fact that our study was performed in the university hospital setting may be considered a limitation compared to the population-based study.

In conclusion, our study showed that the most common types of violence pregnant women were subjected to included verbal and economic violence and that pregnancy was a violence-reducing factor. Although being statistically insignificant in our study, we believe that the other types of violence continue to be a risk during pregnancy. The most significant factors associated with different types of violence were the low educational status of the women and their spouses, living in the rural areas, arranged marriage, living without an official marriage, low income, multiparity, unplanned pregnancies, and dissatisfaction with the sex of the baby.

Health professionals are advised to take a detailed history to diagnose violence, particularly in sensitive periods, such as pregnancy, to conduct interviews confidentially, to define women's violence, and to raise awareness of violent situations through training and counseling services.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Near East University Ethics Review Board (YDU 2015/27-173).

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

Peer-review: Externally peer-reviewed.

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Impact Of Mediterranean Climate and Seasonal Variation on Vitamin D Levels in Children

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BACKGROUND
Vitamin D deficiency causes several health problems. We investigated the frequency of vitamin D deficiency and insufficiency and the impact of seasonal variation on the 25-Hydroxyvitamin D [25(OH) D] levels of healthy children living in Cyprus.

METHODS
A total of 565 healthy children (aged, 0-18 y) under routine pediatric consultation who were followed in our Department of Pediatrics between February 2013 and September 2016 and who were screened for 25(OH) D level were included.

RESULTS
This analysis demonstrated a frequency of 22.5% vitamin D deficiency and 29% insufficiency. 25(OH) D results had a positive correlation with temperature (r=0.25, p=0.00) and a negative correlation with age (r=-0.43, p=0.00). 25(OH) D deficiency was more frequent in females than in males (p=0.04). Deficiency was the most frequent during winter and spring and the least frequent during summer (p=0.00). Deficiency was the most frequent in December and April and the least frequent in June and July (p=0.00), and it was the least frequent in children in the age group of 0-12 month sand the most frequent in those in the age group of 169–216 months (p=0.00). Within this group, 85 of children were evaluated for Ca, P, and alkaline phosphatase (ALP). 25(OH) D results did not have a correlation with Ca, P, and ALP values. When the vitamin D deficient and sufficiency groups were compared, Ca (p=0.01), P (p=0.03), and temperature (p=0.04) values were lower in the deficient group.

CONCLUSION
Vitamin D deficiency is an important health problem even in our country, which has sufficient sun exposure. Therefore, children should spend more time outdoors to adequately benefit from vitamin D synthesis from sunshine.

Keywords: Climate, vitamin D, children

INTRODUCTION

Vitamin D obtained from sun exposure, food, and supplements is important for the growth and remodeling of bones, modulation of cell growth, neuromuscular and immune functions, and control of inflammation. The health effects due to vitamin D deficiency and insufficiency have been studied in the last decades and demonstrated to be related with an increase in infections, allergy, autoimmune diseases, diabetes, and malignancies. Therefore, investigators are currently focusing on the global causes of vitamin D deficiency that depend on seasonal variation, sun exposure, and geographical location. The 25-hydroxyvitamin D [25(OH)D] level is the best and the most accurate measure of the vitamin D status of individuals. 25(OH)D concentrations <20 ng/mL suggest vitamin D deficiency, concentrations between 20 and 30 ng/mL suggest vitamin D insufficiency, and concentrations >30 ng/mL suggest sufficiency (1-3). Cyprus has Mediterranean climate in the North Hemisphere; therefore, June, July, and August are summer months, whereas December, January, and February are winter months. In this study, we aimed to investigate the frequency of vitamin D deficiency and insufficiency and the impact of seasonal variation on the 25(OH) D levels of healthy children living in Cyprus, which is an island situated in the center of the Mediterranean Sea.

This study was presented at the Turkish Pediatrics Congress, May 14-18, 2017, Kyrenia, Cyprus

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MATERIALS and METHODS

Healthy children (aged 0–18 y) under routine pediatric consultation who were followed in our Department of Pediatrics between February 2013 and September 2016 and who were screened for 25(OH) D levels were included. Data on age, sex, 25(OH)D levels, date of admission, and, if available, Ca, P, andalkaline phosphatase (ALP) levels were retrospectively collected from the hospital database program. The average values of temperature (in C) of each month were obtained from the Central Meteorology Office. 25(OH)D levels were measured via the chemiluminescent micro particle immunoassay method in the Clinical Biochemistry Laboratory of our hospital using Abbott commercial kits on Architect Ci8200 instrument (Abbott Laboratories, Abbott Park, Illinois, USA) (4). Ethical approval was provided by the institutional review board. Because this was a retrospective study, informed consent could not be obtained from the parents of children. The correlation of 25(OH)D with age, sex, and each seasonal and 12 months' average temperature was analyzed.

Statistical Analysis

We used descriptive statistics, one-way ANOVA, Pearson correlation analysis, Pearson chi-square test, and Tukey's test for the statistical analysis, and $p<0.05$ were considered significant.

RESULTS

A total of 565 healthy children (282 females and 283 males) who were screened for 25(OH)D level were enrolled. The mean age was 96.4±60.6 months (range, 2-215 months). The mean 25(OH) D level of all children was 31.07±14.1 ng/mL (range, 3.5–108.1 ng/mL), demonstrating a frequency of 22.5% (n=127) of 25(OH)D deficiency, 29% (n=164) insufficiency, and 48.5% of 25(OH)D levels were sufficient (n=274). The mean temperature of the total months was 19.2°C±6.1°C, with the minimum temperature being 10.6°C in January and the maximum being 29°C in August. The mean temperature of the total months was 16.7°C±5.5°C in the deficiency group, 18.5°C±6.0°C in the insufficiency group, and 20.8°C±5.9°C in the sufficient 25(OH)D levels group, with the difference being significantly different (p=0.00).

The 25(OH) D values of children stratified according to sex, seasons, months, and age groups are presented in Figure I. 25(OH) D results had a positive correlation with temperature (r=0.25, p=0.00) and a negative correlation with age (r=-0.43, p=0.00). The evaluation of 25(OH)D results according to sex revealed that 25(OH)D deficiency and insufficiency were more frequent in females than in males (p=0.04) (Figure I). When the 25(OH)D results in the four seasons were compared, the difference was statistically significant. 25(OH)D deficiency and insufficiency were the most frequent during winter and spring and the least frequent during summer (p=0.00) (Figure 2).

When the 25(OH)D results between months were analyzed, the difference was found to be statistically significant (p=0.00). 25(OH) D deficiency was the most frequent in December and April and the least frequent in June and July. 25(OH)D insufficiency was the most frequent in April and November and the least frequent in June. 25(OH)D values were sufficient mostly in June and July (Figure 3).

25(OH)D deficiency was the least frequent in the age group of 0-12 months and the most frequent in that of 169-216 months. 25(OH)D insufficiency was also the least frequent in the age group of 0-12 months and the most frequent in that of 97-168 and 169-216 months. These results were also statistically significant (p=0.00) (Figure 4).

Within this group, 85 of children were evaluated for calcium (Ca), phosphorus (P), and ALP. 25(OH)D results did not have a

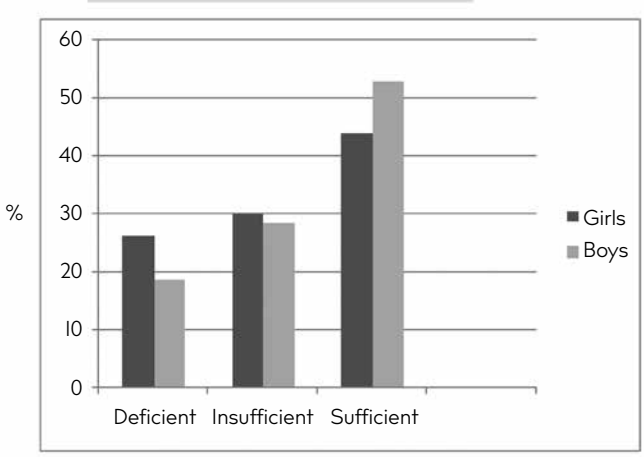

FIGURE I. Distribution of 25(OH)D deficiency, insufficiency and sufficiency based on gender (statistically significant between gender, p<0.04).

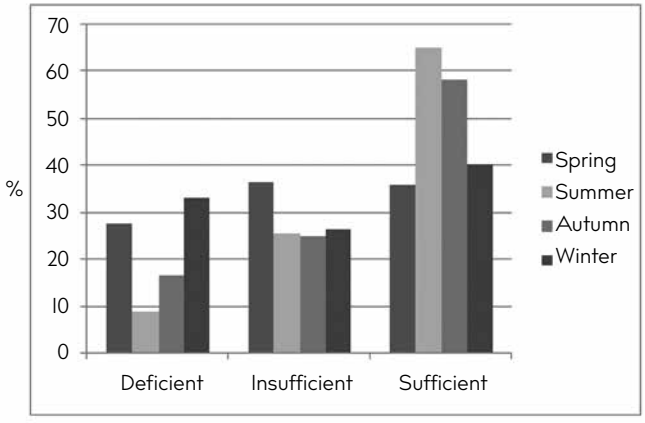

FIGURE 2. Distribution of 25(OH)D deficiency, insufficiency and sufficiency based on seasons (statistically significant between seasons, p=0.00).

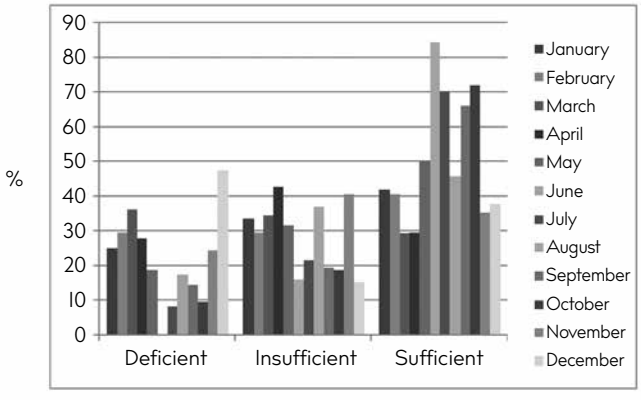

FIGURE 3. Distribution of 25(OH)D deficiency, insufficiency and sufficiency based on months (statistically significant between months, p=0.00).

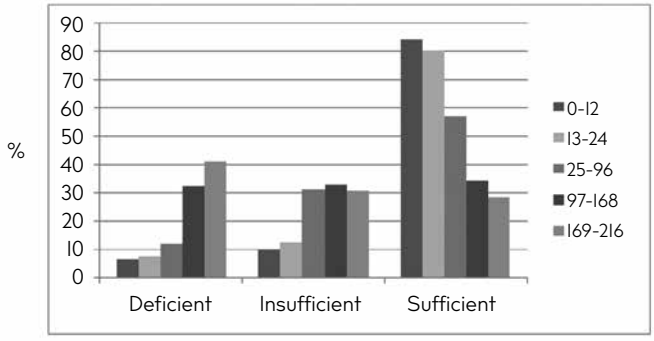

FIGURE 4. Distribution of 25(OH)D deficiency, insufficiency and sufficiency based on age groups (months) (statistically significant between age groups, p=0.00).

TABLE I. Association of 25(OH)D with mean Ca, P, ALP and temperature

	Deficient	Insufficient	Sufficient
Ca (mg/dL) p= 0.01	9.7±0.4	9.9±1.0	10.1±0.5
P (mg/dL) p=0.03	4.7±0.9	4.8±1.2	5.0±0.6
ALP (IU/mL) p=0.45	187.6±119.7	198.7±119.4	314±778.4
Temperature (° C) p=0.04	15.7±6.8	17.3±5.8	19.9±6.0

Ca: calcium; P: phosphorus, ALP; alkalene phosphatase; 25(OH)D; 25- hydroxyvitamin D

correlation with Ca, P, and ALP values. When the vitamin D deficiency and sufficiency groups were compared, Ca (p=0.01), P (p=0.03), and temperature (p=0.04) values were lower in the deficiency group than in the sufficiency group, and the differences were statistically significant. ALP results were also higher in the normal group than in the deficient and insufficient groups, but the difference was not statistically significant (p=0.45) (Table I).

DISCUSSION

Vitamin D synthesis is affected by sunlight exposure, and the measured serum 25(OH)D levels have seasonal variations. In our study, there was a significant seasonal variation in the vitamin D levels of children. A total of 283 children were investigated in a study from Spain, and 25(OH)D level was found to be the lowest during winter (5). Similarly, a longitudinal observational study in Denmark showed that 25(OH)D levels were low during two consecutive winters in healthy adolescent girls and increased during summer (6). Spain and Cyprus are geographical regions that similarly benefit from sunlight. Fluctuations in the vitamin D levels of children between summer and winter may be attributed to the increased indoor lifestyle of children during winter seasons. Actually, in these areas of the world, winter sunlight also has a potential for the maintenance of vitamin D synthesis.

Age is an important determinant of 25(OH)D deficiency that is the most common in adolescents and the least common in infants. A prospective study showed that infants had sufficient vitamin D levels, which wassimilar our result. This shows that infants aged up to 1 year receive sufficient vitamin D majorly via supplements (7). However, the total vitamin D levels in infants were insufficient to compare them among different seasons. Adolescents are assumed to require higher amounts of vitamin D for maintaining an adequate 25(OH)D status; however, they have been reported to have lower 25(OH)D levels (8). With increasing age, vitamin D becomes deficient or insufficient, which shows that vitamin D efficiency decreases. Clothing style or increased indoor activities of adolescents may be responsible for this result.

Sex was related with vitamin D levels in the present study, being lower in females than in males. Some other studies have also reported that females have lower vitamin D levels, which l associated with adiposity. The hypothesis was that as adiposity increases, 25(OH)D is sequestered in adipose tissue and outdoor activities are less common in girls (8). However, another study on 962 children has shown that sex is not related to vitamin D levels (9).

One of the previous studies on vitamin D status in Cyprus has revealed that among 671 adolescents, 90% had vitamin D deficiency or insufficiency, but only10% had normal levels. Vitamin D deficiency was more frequent during winter and spring. During winter, as the sun exposure time decreased, vitamin D levels also decreased. In addition, vitamin D levels were lower in females (10).

Another study from Cyprus conducted 30 years ago has demonstrated that urine Ca levels indicate the vitamin D status of children tested in June and September. Infants born or who had been living in Cyprus for the last year had higher levels of calciuria and serum calcitriol than those who had just immigrated to the island from North Anatolia. Therefore, vitamin D synthesis was thought to be increased by sunlight, and this did not cause hypervitaminosis or hypercalciuria (11).

There are some limitations to this study, one of which is that parathyroid hormone levels were not measured. Further, confounding factors such as skin color, activity levels, duration of sun exposure, clothing styles, and dietary supplements that can affect vitamin D levels were not analyzed.

Although being in a region with a typical Mediterranean climate and not having a closed clothing tradition, vitamin D deficiency is an important health issue in our country. Children and adolescents should be encouraged to have more outdoor activities to adequately benefit from the power of vitamin D synthesis with sunshine that is a wealth for the country.

Ethics Committee Approval: Ethics committee approval was received for this study from the Institutional Review Board of Near East University School of Medicine (Approval Date: 17.11.2016, Approval Number: 345)

Informed Consent: Since this was a retrospective study, informed consent could not be taken from parents of the patients.

Peer-review: Externally peer-reviewed.

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Original Article

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Awareness of Radiation among Physicians Dealing with Pediatric Patients

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INTRODUCTION
Medical radiation constitutes approximately 40% of the radiation to which human beings are exposed. The pediatric age group is very sensitive to radiation. Therefore, optimizing requests for radiologic examination is far more important in the pediatric group; thus, physicians' knowledge about medical radiation and as low as reasonably achievable (ALARA) principles, who are in charge of managing pediatric patients was investigated.

MATERIAL and METHODS
In total, 100 surveys comprising 8 questions each were distributed to four hospitals (two university hospitals and two government hospital) and answered by volunteers.

RESULTS
Among 74 responders the awareness of radiation protection was found to be high (95.9%). However, only 23 (31.1%) of the responders were aware of ALARA principles. Contribution of medical radiation to overall was correctly known by 20 (27%), underestimated by 41 (55.4%), and overestimated by 13 (17.6%). Estimation of possible cancer risk was correctly known by 15 (20.3%) of the responders. Informed consent from the parents attributed as valuable for 51 (68.9%) of the responders. Only 8 (10.8%) of the responders had received an education regarding radiation in medical examinations; of these 8, only 3 (4.1%) of them had received formal education.

CONCLUSION
Awareness of medical radiation was higher than reports of previous years, despite lack of formal education. However, majority of the physicians underestimated and a minority overestimated radiation in medical examinations. ALARA is the key principle in radiation protection. In this context, communication between radiologists and clinicians may be established via regular scientific meetings.

Keywords: Radiation, ALARA, pediatrics

INTRODUCTION

Radiologic imaging is very important in diagnosis and handling of patients in both adult and pediatric age groups. Food and Drug Administration classified X-ray as a human carcinogen in 2004 (1). Humans are exposed to low doses of radiation in daily life; radiation from soil, rocks, air, and water is called naturally occurring background radiation. Radiological examinations are another source of radiation.

Computed tomography (CT), being one of the most frequently ordered radiologic examination, is responsible for the majority of radiation to which patients are exposed. After the introduction of CT as a diagnostic tool, since 1972 to mid-1990s, an eight-fold increase in its usage had been demonstrated in high-income countries (2-4). CT accounts for approximately 4% of medical radiologic examination and contributes to 40% of the total collective dose (5).

For a lifetime period children have higher risk for higher dosage of radiation exposure for each organ. . Children are 10 times more sensitive to radiation compared with middle-aged adults (6, 7). Twenty percent of total cancer mortality from

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CT examinations was estimated to occur in children < 5 years of age. Lifetime risk of a young child undergoing a CT was noted to increase approximately by 1/1000 (7). In addition; longer life expectancy in children when compared to adults; makes radiation concept much more important.

The "As low as reasonably achievable" (ALARA) principle emerged to guide the imaging approach to decrease exposed radiation from radiological imaging according to the BY Society of Pediatric Radiology (8). There are numerous studies that demonstrate a low level of awareness of the diagnostic medical radiation among pediatricians (9, 10).

In contrast, radio phobia is also harmful for patients, as it can induce stress and cause avoidance of imaging and misdiagnosis (11). To ensure balance between underestimation of risk of radiation and radio phobia, the knowledge and attitudes of physicians should be primarily documented.

The aim of the present study was to evaluate the knowledge of physicians who deal with the pediatric age group and request radiologic examinations. Physicians who belonged to different specialties who deal with pediatric age group such as pediatricians, ENT (ear, nose, and throat) doctors, neurosurgeons, orthopedics, and doctors working in emergency departments, physical treatment (PT) specialists, and pediatric surgeons were enrolled in the present study.

MATERIALS and METHODS

The study was approved by the ethical committee of Near East University on February 22, 2018, with a code of YDU/2018/55-532. In total, 100 surveys comprising 8 questions each were distributed to two university hospitals and two government hospitals. The survey is shown in Figure 1.

1.Do you think that 'radiation protection' is important for pediatric group of age?
A)Yes B)No

2.Have you ever heard about ALARA principles?
A)Yes B)No

3.Human beings are exposed to radiation from both natural and man-made resources. What is the contribution of medical radiation to total?
A) 1.5 B)5 C)15 D)40 E)90

4.How does the radiosensitivity of a 5-year old child when compared to an adult?
A) Less in children when compared to adults
B) Same with adults
C) 2 times more than adults
D) 5 times more than adults
E) 10 times more than adults

5.Do you think that before performing a radiologic axam, parent shold be informed about the risk of radiation?
A)Yes B)No

6. Have you ever received any education about radiation in medical imaging?
A)Yes B)No

7. If your answer is yes;
A.formal education (lecture, course, radiology rotation)
B.other (personal reading, media,..)

8. Do you believe that you need to increase your knowledge about this topic?
A)Yes B)No

FIGURE 1. Questions in the survey

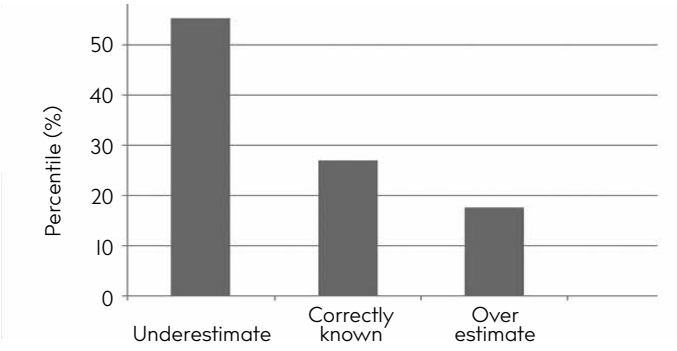

FIGURE 2. Estimation of the physicians about the contribution of medical radiation to overall radiation exposed by humans

Doctors from departments of pediatrics, emergency, pediatric surgery, orthopedics and traumatology, otorhinolaryngology, physical therapy, and neurosurgery who evaluated pediatric age children and could prescribe radiologic examination were requested to participate in the study. Volunteer doctors were also enrolled in the study. Seventy-four surveys were completed and returned.

The data were analyzed using the commercially available software SPSS (Statistical Package for Social Sciences) version 17.0 (IBM Corp.; Armonk, NY, USA). Statistical analysis was performed by using the Chi-square test; $p<0.05$ was considered to be statistically significant. All descriptive data were reported as percentages.

RESULTS

Of the 100 surveys, 74 were completed and returned (74% response rate). In total, 31 (43.2%) from university hospitals and 42 (56.8%) from government hospitals. Twenty-six of the responders were pediatricians, 12 were physicians working in emergency department, 12 were orthopedic and traumatology specialists, 10 were ENT doctors, 7 neurosurgeons, 3 pediatric surgeons, and 4 Physiotherapy (PT) specialists. .

Of the 74 responders, 71 (95.9%) thought that radiation protection is important in pediatric age. Only 23 (31.1%) of the responders had earlier heard about the ALARA principles, whereas 51 (68.9%) had not heard about ALARA principles.

Regarding the question that asked the percentage of contribution of medical imaging to overall radiation, 20 (27%) answered correctly, 41 (55.4%) underestimated the value, and 13 (17.6%) overestimated the value.

In response to the question that evaluated the radiosensitivity of children when compared with adults, 15 (20.3%) responded correctly and 59 (79.7%) underestimated the ratio.

When asked about the necessity of discussion risk of radiation prior to radiologic examination with the parents, 23 (31.1%) of the responders thought that there is no need for routine discussions. Fifty-one (68.9%) of the responders were on the side of informing parents about the risks of radiologic examination.

Among those physicians, no correlation was found when evaluated according to specialty or workplace (university/government hospitals) ($p<0.05$).

TABLE I. Number of correct answers based on the speciality of the responder

	PEDS	Emerg	ENT SPC	PT SPC	Ped Surg	Neu Surg	OTS	Total
Awareness of the importance of protection against radiation (number of correct answers/total) (%)	25/26 (96.2)	12/12 (100)	9/10 (90)	4/4 (100)	3/3 (100)	7/7 (100)	11/12 (91.7)	71/74 (95.9)
Awareness of the ALARA principle (number of correct answers/total) (%)	9/26 (34.6)	5/12 (41.7)	1/10 (10)	2/4 (50)	2/3 (66.7)	3/7 (42.9)	1/12 (8.3)	23/74 (31.1)
Contribution of medical radiation (number of correct answers/total) (%)	10/26 (38.5)	3/12 (25)	2/10 (20)	1/4 (25)	1/3 (33.3)	1/7 (14.3)	2/12 (16.7)	20/74 (27)
The effect of radiation on children when compared with that on adults (number of correct answers/total) (%)	9/26 (34.6)	0/12 (0)	3/10 (30)	1/4 (25)	1/3 (33.3)	0/7 (0)	1/12 (8.3)	15/74 (20.3)
Necessity of informing the parents (number of correct answers/total) (%)	13/26 (50)	9/12 (75)	6/10 (60)	4/4 (100)	3/3 (100)	5/7 (71.4)	11/12 (91.7)	51/74 (68.9)
Education on medical radiation (number of correct answers/total) (%)	4/26 (15.4)	2/12 (16.7)	1/10 (10)	0/4 (0)	0/3 (0)	1/7 (14.3)	0/12 (0)	8/74 (10.8)
Do you want to increase your knowledge? (number of correct answers/total) (%)	26/26 (100)	12/12 (100)	9/10 (90)	4/4 (100)	3/3 (100)	7/7 (100)	10/12 (83.3)	71/74 (95.9)

PEDS: pediatrics; Emerg: emergency physician, ENT Specialist: ear nose throat specialist; PTS: physical therapy specialist; Ped Surg: pediatric surgery; Neu Surg.: neurosurgery; OTS: orthopedic and trauma specialist

Among the responders, 66 (89.2%) had no education about radiation. Only 8 (10.8) of the responders had education about radiation and among those 3 (4.1%) had received formal education.

Seventy-one (95.9%) of the responders considered getting educated about radiation. The answers according to specialty are summarized in Table I.

No statistically significant difference was documented between the responses of physicians from government hospital and those from university hospital.

DISCUSSION

Ionizing radiation is known to be carcinogenic and being especially important in pediatric age group, as children are more prone to harmful effects and they have a longer life expectancy. Human beings are exposed to radiation from the environment and during medical examination. Natural background radiation is estimated to be 3 mSv in 1 y and estimated dose of a flight across country is 0.04 mSv. For clinical examinations, estimated effective doses of single chest X-ray, two-view X-ray, head CT, chest CT, and abdominal CT were up to 0.01, 0.1, 2, 3, and 5 mSv, respectively (12). Most of the medical radiation is because of CT.

Radiation dosage during CT of the red bone marrow and brain were estimated to be associated with leukemia and brain tumors by Pearce et al. (13). In a study conducted on the pediatric age population that involved 11 million patients born between 1985 and 2005 and observed over 10 years, a 24% increase in the incidence of tumors within the group who were exposed to CT scans was documented (14).

When CT scan parameters are not properly adjusted for pediatric patients, small cross-sectional area of the child results in a concentrated dose of radiation in a smaller amount of tissue, resulting in higher effective dose compared with that experienced by adults during scans (15).

There is a general understanding that 30% of all radiologic examinations are not helpful clinically (16). Radiological procedures that are not justified for a specified objective result in excessive, unnecessary exposure of patients to medical radiation (17). For the proper use of radiological imaging, diagnostic tests should be appropriate, justified, and optimized. Appropriate means that the imaging is suitable for the solution of a clinical problem. Justification means to take into consideration the possible risk to health and clinical benefit of the test. Additionally, the examination must be necessary and not replaceable by other diagnostic tests (7, 18). Optimization is related to the concept of image quality and exposure reduction (19). In a recent study performed by Zewdu et al. (20), higher doses of ionizing radiation exposure in children in Ethiopia had been demonstrated. Dose reduction may be possible by education and regular provision of dose information. For a better imaging quality and dose optimizing, dose should be maintained according to the ALARA principles. With this aim, studies involving exposure to ionizing radiation may be performed routinely.

Therefore, principles of ALARA have become much more important for the pediatric age group patients to minimize long-term effects of ionizing radiation.

In our study, 71 (95.9%) of the responders were aware of the importance of radiation protection. However, only 23 (31.1%) of them were aware of ALARA principles. Eleven percent of pediatricians were aware of ALARA in a recent study performed by Ekşioğlu et al. (9). Awareness of CT radiation dose among pediatricians was documented as 15% by Al-Rammah (10). In that study, the knowledge of physicians seemed to be higher than reported. Only 8 (10.8) of the responders had education about radiation, and among those only 3 (4.1%) had received formal education. Educational levels were reported to be between 5% and 37% in different surveys (9, 21-23). This higher rate of knowledge despite low education level of that topic may be due to educational level of the population that supply interaction between physicians and patients both for risks and treatment planning.

Radiosensitivity of children compared with adults was correctly answered only by 15 (20.3%) and underestimated by 59 (79.7%) of the responders.

Regarding the question asking the percentage of contribution of medical imaging to overall radiation, 20 (27%) answered correctly, 41 (55.4%) underestimated the value, and 13 (17.6%) overestimated the value (Figure 2). Overestimation of the risk is higher than a previous report (9). Emerging the topic of radiophobia is important, as it can lead to misdiagnosis.

For CT scans, it has been demonstrated that after exposure, within minutes, an increase in DNA double-strand breaks is induced, and levels of DNA double-strand breaks is higher compared to pre-CT levels. At a time, interval between 5 and 24 h of DNA double-strand breaks was repaired to less than initial level (pre-CT level) except in one patient (24).

In addition, informed consent from the parents attributed as valuable for 51 (68.9%) of responders that is similar to the literature (9). Studies demonstrated that with quantitative information prior to a CT scan about CT related radiation dose and potential risk will not significantly change parent's thoughts to have their child undergoing a CT scan (25).

Seventy-one (95.9%) of the responders consider taking education about radiation. No statistically significant difference was detected between the responses of physicians from university or government hospitals. This may be due to small society and the interaction between doctors working in university and governmental hospital.

Our results indicate that the awareness of medical radiation among physicians in charge of pediatric patients is high but awareness of ALARA is low. There is no standardized education for medical radiation. A post-graduate educational program about the risks of ionizing radiation and communication between radiologists and clinicians with regular scientific meetings may fulfill the demand in the way of increasing knowledge about medical radiation and optimizing requests of radiological examination.

Ethics Committee Approval: Ethics committee approval was received for this study from the Institutional Review Board of Near East University (Approval Date: February 22th, 2018; Approval Number: YDU/2018/55-532).

Informed Consent: N/A.

Peer-review: Externally peer-reviewed.

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Pictorial Review

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Clinical Mimickers of Renal Stones: Incidental Findings on Renal Stone Computed Tomography Protocol

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Urinary tract stones that cause acute flank pain are diagnosed using noncontrast computed tomography (CT) with a high sensitivity (95-98%) and specificity (96-100%). CT has an advantage of detecting urinary and extraurinary pathologies, including appendicitis, mesenteric lymphadenitis, epiploic appendagitis, sclerosing mesenteritis, acute cholecystitis, spondylolysis, retro aortic left renal vein, pelvic congestion syndrome, and pneumonia, which cause flank pain. We present the incidental abdominal CT findings of patients who had undergone noncontrast CT with the symptoms of flank pain mimicking renal colic without any findings of urolithiasis upon imaging.

Keywords: Renal stone, computed tomography, flank pain

INTRODUCTION

Urinary tract stones that cause acute flank pain are diagnosed by noncontrast computed tomography (CT) with a high sensitivity (95-98%) and specificity (96%–100%) (1). CT is a fast and easily accessible imaging method that can detect urinary tract stones of all sizes with very low interobserver variability in the emergency departments. CT also has an advantage of detecting urinary and extraurinary pathologies causing flank pain without any bowel preparation or intravenous (IV) contrast injection and is, therefore, widely used in cases of colic-like pain suggesting renal stone (1, 2).

However, several surgical and medical emergencies, including appendicitis, mesenteric lymphadenitis, epiploic appendagitis, and sclerosing mesenteritis may clinically resemble renal stone complaints. Among the cases (n=212) who underwent noncontrast CT scan for acute flank pain, the most frequent pathology was urinary tract stone that was found in 161 (76%) cases. Other pathologies determined in the order of frequency were mesenteric lymphadenitis (n=19; 9%), appendicitis (n=12; 5%), sclerosing mesenteritis (n=6; 3%), epiploic appendagitis (n=4; 2%), spondylolysis (n=3; 1.5%), pneumonia (n=3; 1.5%), acute cholecystitis (n=2; 1%), and pelvic congestion syndrome (PCS; n=2; 1%). The incidence of retro aortic left renal vein (RLRV) was not calculated separately in our study because it was found to coexist with other pathologies.

Radiologists should be familiar with these entities to achieve an appropriate diagnosis that would change the management of the patients. In this article, we present a variety of disorders that may clinically mimic urolithiasis and can be incidentally found using a renal stone CT protocol.

Appendicitis

Appendicitis being the most common cause of acute abdomen pain should be considered in the differential diagnosis of patients applying with acute flank pain (2). It is a relatively common finding without any imaging findings of stone in the urinary tract, which requires acute surgery. Although ultrasound (US) is the first-line diagnostic modality in appendicitis, unenhanced CT examination has high sensitivity and specificity rates of 84%–96% and 92%–98%, respectively (2, 3). Besides, noncontrast CT examination has the advantages of elimination of IV contrast-related complications and the additional time necessary for oral contrast intake during patient preparation (3).

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The CT findings of appendicitis include dilatation of appendix (>6 mm in diameter), heterogeneity of periappendiceal and pericecal fat as a sign of inflammation, and intraluminal appendicolith and formation of phlegmon or abscess (1) (Figure 1). Besides, gas in the appendiceal lumen does not exclude the diagnosis of acute appendicitis.

Mesenteric Lymph Nodes

Mesenteric lymph nodes that are smaller than 4.6 mm in short axis and are accepted as within normal limits of dimensions can be clearly identified on CT. The lymph nodes are evaluated according to their size, number, location, and attenuation on CT along with the patients' clinical history because lymph nodes can also be detected in many conditions without any findings of malignancy or inflammation. Although enlarged lymph nodes suggest many pathologic conditions, such as tumor, lymphoproliferative disorder, inflammation, and infection, mesenteric lymph nodes with normal dimensions can also be detected in normal cases. This is important to avoid misdiagnoses of the normal mesenteric lymph nodes as those with malignant or benign pathology (4).

Inflammatory lymph nodes are frequently noted in appendicitis, whereas the infective type of lymph nodes is seen in local or many systemic infections, usually in the pediatric population during viral infections (5). Inflammatory lymph nodes are less than 1 cm in short axis diameter and are usually located in the right lower quadrant adjacent to the small bowel and psoas muscle. This may reflect gastroenteritis or mesentery adenitis etiologies (5).

Mesenteric lymphadenitis can further mimic urolithiasis, which is not a surgical emergency and does not need surgery (Figure 2).

FIGURE 1. Axial noncontrast CT scans show thickened appendix with periappendiceal fat stranding (arrow) in a 38-year-old female (a); and a hyperdense appendicolith (arrow) at the lumen of the inflamed appendix of a 37-year-old male (b)

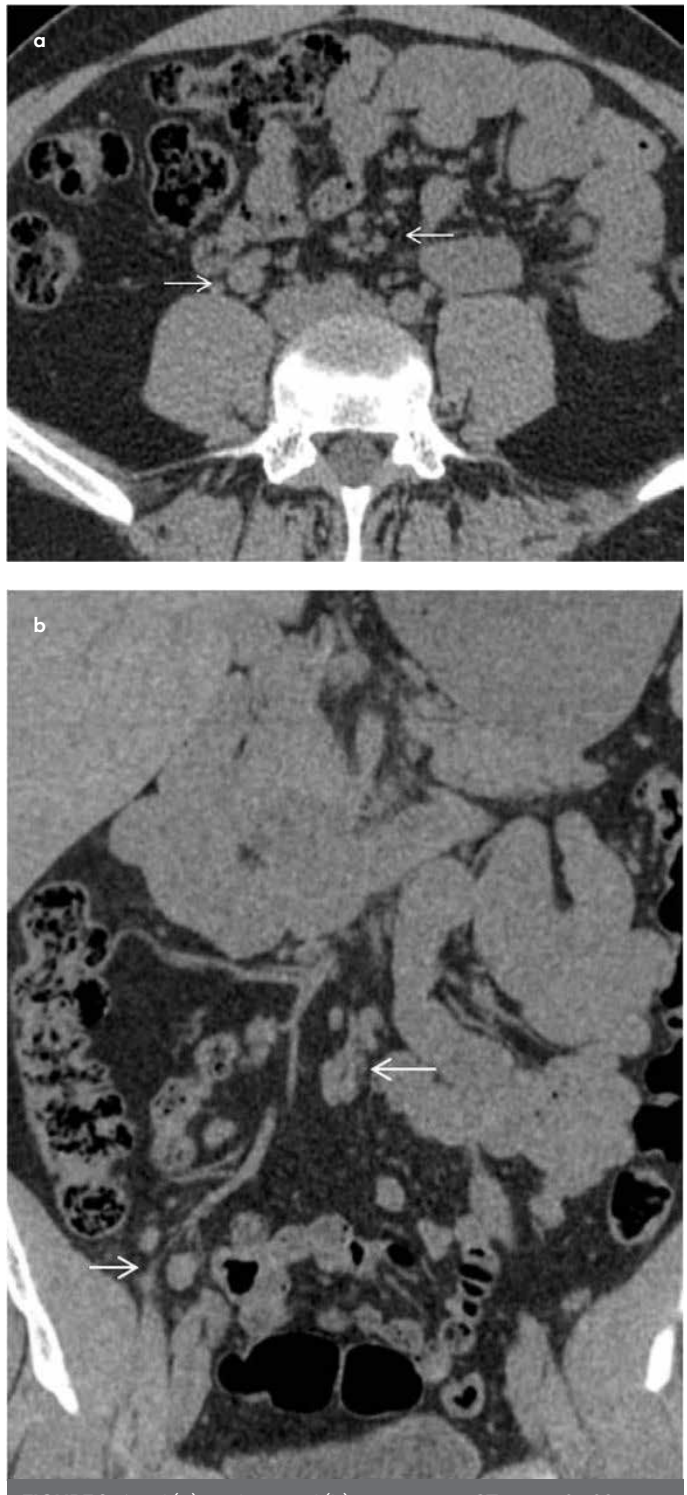


FIGURE 2. Axial (a); and coronal (b) noncontrast CT scan of a 29 year-old male patient with the complaint of right-sided flank pain was found to have enlarged mesenteric lymph nodes in the right lower quadrant of the abdomen (arrow). Patient's symptoms were relieved following an antibiotic treatment

Epiploic Appendagitis

Epiploic appendages are peritoneal pouches that arise from the serosal surface of the colon except the rectum. They have a typical dimension of 0.5-5 cm, and the largest ones are found in the sigmoid colon. They are associated with colonic diverticules and consist of adipose tissue and vessels, which are the most frequent cause of inflammation of the epiploic appendages due to torsion or venous occlusion leading to ischemia. The other causes are listed as hernia incarceration, intestinal obstruction, and intraperitoneal loose body. Acute epiploic appendagitis most commonly presents

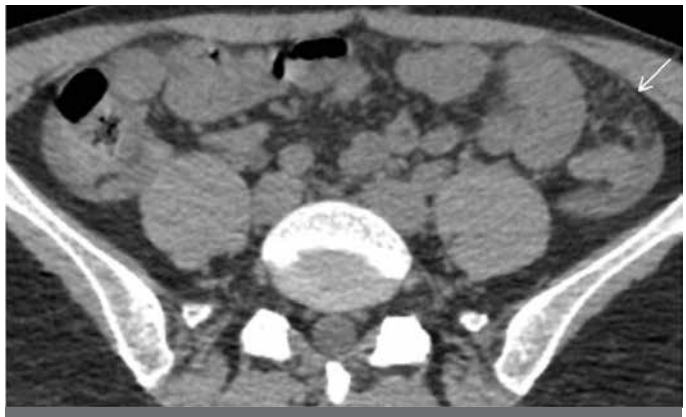


FIGURE 3. Acute epiploic appendagitis in a 35-year-old female. Axial noncontrast CT image shows inflamed epiploic appendagitis (arrow) that abuts the sigmoid colon

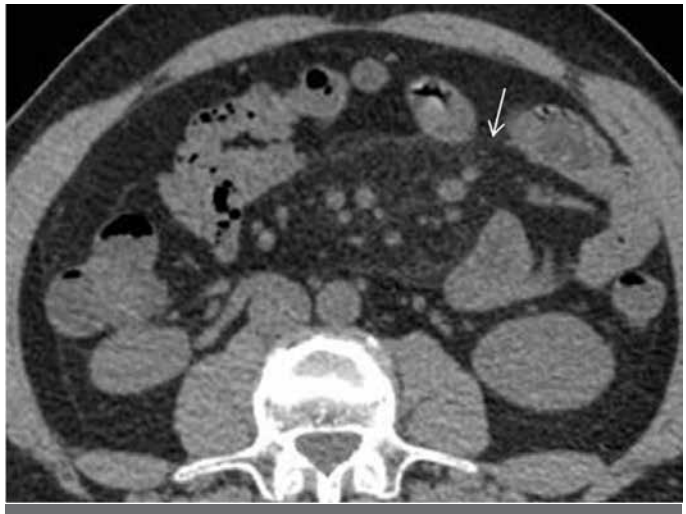


FIGURE 4. Axial noncontrast CT image of a 40-year-old male with sclerosing mesenteritis (panniculitis) shows heterogeneity of the central mesenteric fat with small lymph nodes within the inflamed area (arrow)

FIGURE 5. Axial noncontrast CT scan of a 46 year-old female patient admitted with complaints of right-sided flank pain showing gallbladder wall thickening and pericholecystic fluid compatible with acute cholecystitis

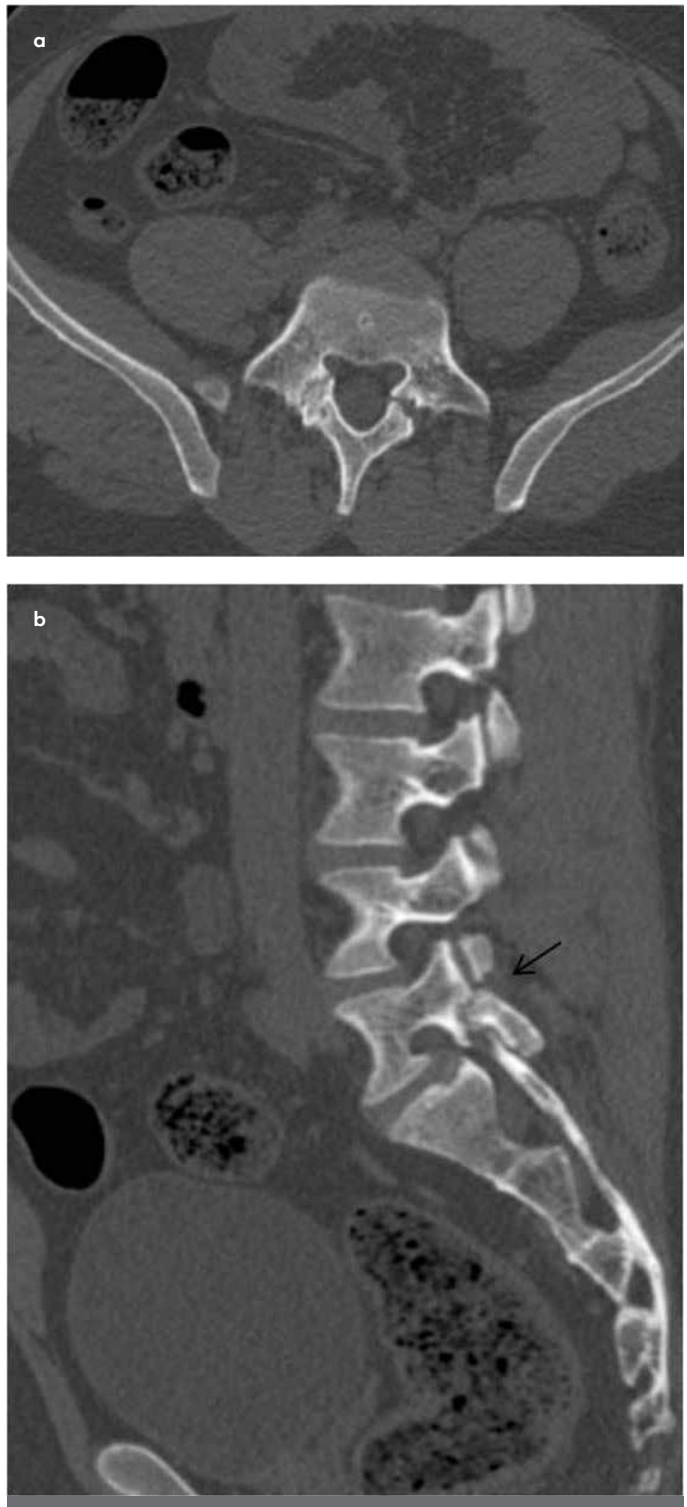


FIGURE 6. Axial (a); and sagittal reformatted (b) noncontrast CT images show spondylosis at the lumbar spine with bilateral pars interarticularis defects of the fifth lumbar vertebra in a 29 year-old male (arrow)

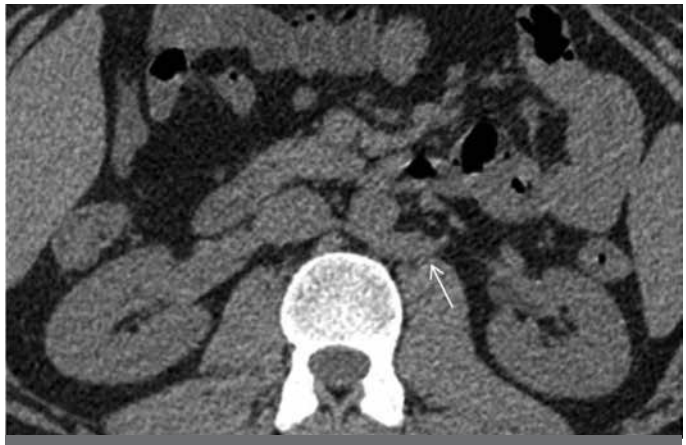
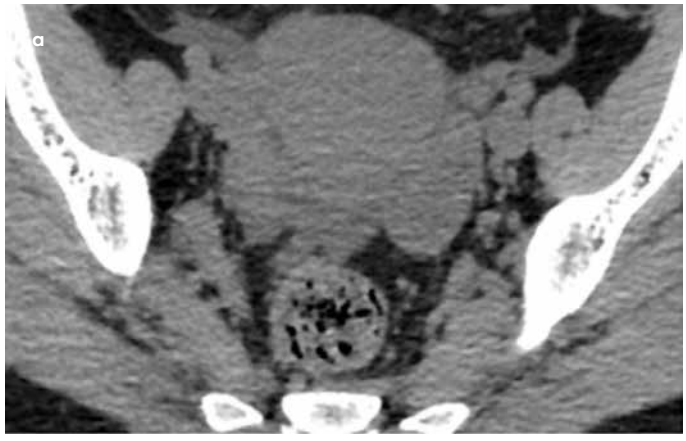


FIGURE 7. Retro aortic left renal vein in a 29-year-old male is demonstrated in an axial noncontrast CT scan. The left renal vein was observed to cross posterior to the aorta and drain into the inferior vena cava (arrow)



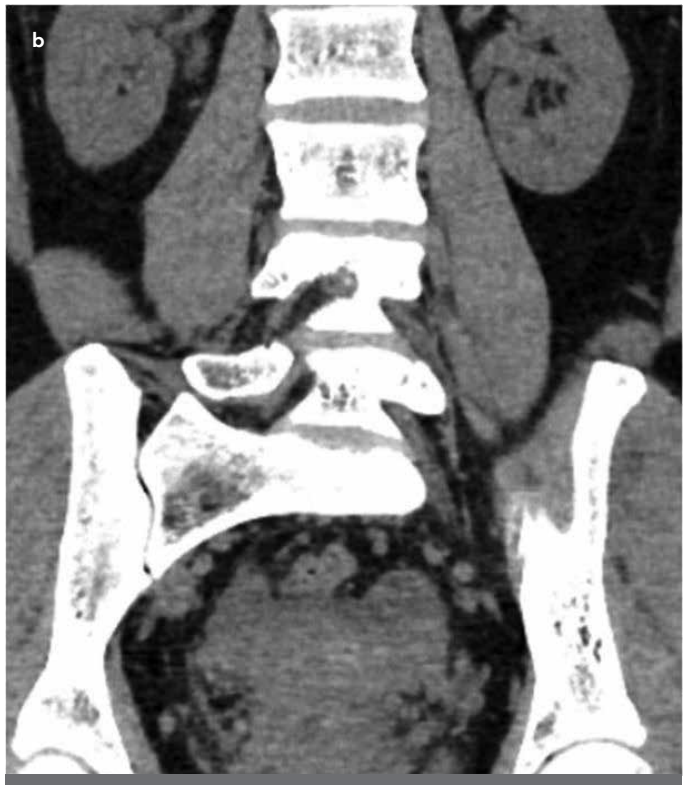
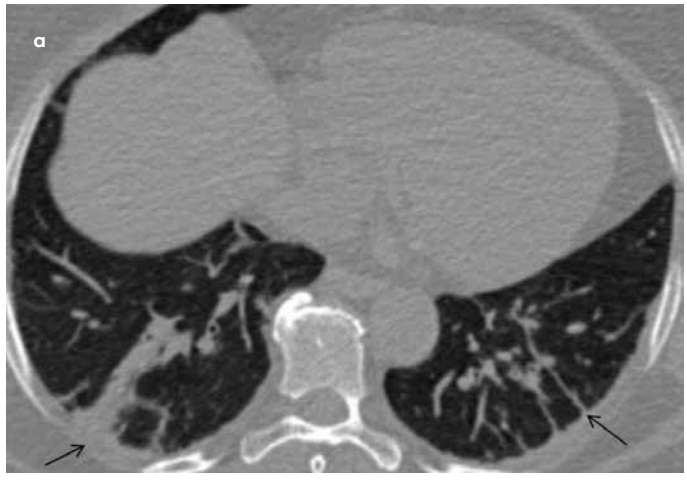


FIGURE 8. Axial (a); and coronal (b) noncontrast CT scan in a 34 year-old female shows prominent parauterine dilated pelvic veins causing PCS

in the fourth to fifth decade of life with the complaints of lower quadrant pain, particularly on the left side. The clinical symptoms of acute epiploic appendagitis are nonspecific, which may be misdiagnosed as acute diverticulitis or appendicitis.

The typical CT appearance of acute epiploic appendagitis is the presence of a fat-density lesion with a central high attenuation focus that represents a thrombosed vessel with surrounding inflammatory changes abutting the anterior wall of the sigmoid colon. The descending colon and the right hemicolon are the other common sites of acute epiploic appendagitis in the order of decreasing frequency. The thickening of the parietal peritoneum secondary to the spread of inflammation and that of the wall of the colon, where its thickness is usually in normal limits, are other CT findings of acute epiploic appendagitis (Figure 3). The condition is conservatively treated using oral anti-inflammatory medication, usually without antibiotics. It is important to recognize and diagnose acute epiploic appendagitis to avoid patient hospitalization and unnecessary treatment (6, 7).

Nowadays, it can be diagnosed easily by CT and can be conservatively treated.



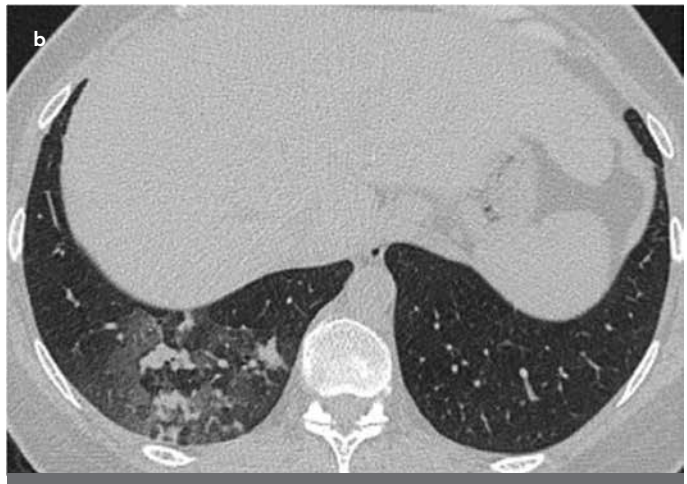


FIGURE 9. Axial noncontrast CT images obtained at the level of lower lung lobes show bilateral consolidation and interseptal thickening prominent in the right (a); and ground glass opacities in right lower lung lobe (b) that are compatible with pneumonia

Sclerosing Mesenteritis (Panniculitis)
Sclerosing mesenteritis is a rare disorder that is characterized by chronic inflammation of the mesenteric adipose tissue. The mesentery of the small bowel is the most frequently involved tissue; however, the mesocolon, peripancreatic region, omentum, retroperitoneum, or pelvis can occasionally be affected. Although the pathogenesis of sclerosing mesenteritis is unclear, an autoimmune response, infection, trauma, and ischemia of the mesentery are the suggested causes. It is usually associated with many idiopathic inflammatory conditions that are characterized by chronic inflammation and fibrosis, such as vasculitis, granulomatous disease, rheumatic disease, retroperitoneal fibrosis, and malignancies. The clinical presentation varies as abdominal pain, intestinal obstruction or ischemia, abdominal mass, fever, or diarrhea (8, 9).

Sclerosing mesenteritis can be observed as an increased attenuation of fatty mesentery with small lymph nodes, which is called mesenteric panniculitis, or additionally as a solid soft-tissue mass in the mesentery on CT. The soft-tissue mass is usually located in the small bowel mesentery; however, the pancreas or porta hepatis can also be involved, and mesenteric collateral vessels may develop in the long term (Figure 4) (8, 9).

Acute Cholecystitis
An abdominal US is the first modality to evaluate a patient with typical presentation of right upper quadrant pain, fever, leukocytosis, and positive Murphy sign of acute cholecystitis in daily practice. CT is usually performed for the differential diagnosis of a patient with confusing symptoms or for identifying the complications of acute cholecystitis (10). The classic CT findings of acute cholecystitis are distended gallbladder, wall thickening, mucosal hyperenhancement, pericholecystic fat or fluid stranding, and gallstones (Figure 5). Diffuse gallbladder wall thickening is not a specific finding, as it can also be seen in hypoalbuminemia, ascites, chronic cholecystitis, hepatitis, and unrelated inflammatory processes in the abdomen. US remains the first choice to evaluate gallbladder stones and acute cholecystitis because of its advantages when compared with CT. Although US and CT have similar specificity (95% vs. 93%), US has higher sensitivity (>95%) rate (11). The other advantages of the US include bedside examination, lack of ionizing radiation, relatively low cost, and ability to evaluate adjacent organs (10).

Spondylolysis
Spondylosis is defined as a defect in the pars interarticularis of the vertebral body, which connects the superior and inferior articular facets. It is believed to be caused by repeated trauma usually on a congenitally weak or dysplastic vertebra. Patients are usually asymptomatic; however, the symptoms include low back pain with extension or rotation of the lumbar spine. Belfi et al reported that 29 of 510 cases (5.7%) had spondylosis and were examined using an abdominal CT for reasons unrelated to the lumbar spine (Figure 6) (12).

Retroaortic Left Renal Vein
Retroaortic left renal vein (RLRV) is one of the congenital anomalies of the left renal vein that posteriorly travels to the aorta and is compressed between the aorta and vertebral body. It is also called the posterior nutcracker phenomenon (NP). The common symptom of posterior NP is hematuria, pain, and urinary tract infection due to the increased renal vein pressure owing to the compression. Also, the awareness of RLRV and other renal vein anomalies is important during retroperitoneal surgery

RLRV is easily diagnosed in a CT, which may be difficult to examine vascular structures by US because of the overlying abdominal gas (Figure 7) (13).

Pelvic venous Congestion
Pelvic venous congestion is one of the common causes of chronic pelvic pain, which is defined as nonmenstrual pain for at least 6 months. PCS may be a result of several causes, including obstructing vascular anatomic anomalies, valvular incompetence, portal hypertension, or the acquired inferior vena cava syndrome. Hereditary factors, hormonal influence, pelvic surgery, retroverted uterus, history of varicose veins, and multiple pregnancies are considered as the risk factors. The symptom of this disorder is deep and prolonged pain, which can be bilateral or unilateral and may be associated with posture or activity that increases abdominal pressure. It can be diagnosed using noninvasive methods, such as CT or magnetic resonance imaging instead of venography, to show dilated and tortuous venous structures (Figure 8) (14).

Pneumonia
The lower lobe pneumonia has the same dermatomes with epigastric and umbilical regions in the abdomen. Pneumonia, which involves the lower lobes of the lung with pleuritis, may be presented as acute cholecystitis or other causes of acute abdominal pathology. In case of lack of abdominal symptoms except pain, pneumonia should be considered in the differential diagnosis checklist (Figure 9) (15).

CONCLUSION
Acute abdominal pain is caused by an extensive list of diseases that mimic the clinical symptoms of renal colic, which can be identified with specific CT findings. Knowledge and recognition of mimicking diseases, which are identified by increasing usage of unenhanced CT as the first-line imaging modality for flank pain, is important to diagnose and manage therapy in these conditions.

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CYPRUS JOURNAL OF MEDICAL SCIENCES

Case Report

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Repeated Tracheostomy Tube Cuff Rupture: Tracheobronchopathia Osteochondroplastica

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Tracheobronchopathia osteochondroplastica (TPO) is a rare bening chronic disease that affects the lower part of the trachea and the upper part of the main bronchi and is characterized by multiple submucosal ossified and/or cartilaginous nodules projecting into the lumen of the airway. Here we report a case of TPO diagnosed during surgical tracheostomy by repeated tracheostomy tube-cuff rupture. Repeated cuff rupture during surgical tracheostomy occurred possibly because of bony and cartilaginous tissue in the tracheal wall. Many TPO patients are unable to be diagnosed because they are asympthomatic. In diagnosing TPO, the typical scene from Fiberoptic broncoscopy (FOB) is very pathognomonic and biopsy is not always necessary; FOB also helps to screen the tracheal area. If bed side percutaneous tracheostomy or surgical tracheostomy is planned, FOB may be routinely performed to diagnose TPO and/or to prevent complications from percutaneous or surgical tracheostomy.

Keywords: Tracheobronchopathia osteochondroplastica, surgical tracheostomy, repeated tracheostomy tube-cuff rupture

INTRODUCTION

Tracheobronchopathia osteochondroplastica (TPO) is a rare benign chronic disease involving the lower part of the trachea and the upper part of the main bronchi. It is characterized by multiple submucosal ossified and/or cartilaginous nodules projecting into the lumen of the airway (1-3). It was first reported by Rokitansky, Luschka, and Wilks in the 19th century (1-4). Its etiology, pathology, and natural history are still unknown (1-3). Two theories, Virchow's theory and metaplastic theory, have been postulated about the pathogenesis (1, 2, 5). TPO can be associated with chronic infections, inflammation, trauma, amyloidosis, silicosis, atrophic rhinitis, and allergic bronchopulmonary aspergillosis (1-3). The incidence of TPO ranges from 0.01% to 4.2% (2). Although nearly 400 cases have been reported worldwide, many TPO patients could not be diagnosed due to the unawareness of clinicians (2-4). The first presentation may be in the operating room with difficult intubation (1). Many patients affected by TPO are asymptomatic or manifest non-specific respiratory symptoms, such as chronic cough, dyspnea, hemoptysis, wheezing, and recurrent respiratory infections (2, 4, 5). It is usually diagnosed in the sixth or seventh decade of life, but it may also affect younger people (3-5). Here we present a case of repeated tracheostomy tube cuff rupture during surgical tracheostomy after we obtained consent from the patient's relatives.

CASE PRESENTATION

A 75-year-old-man, intubated by the 112 emergency medical service because of loss of consciousness after falling at home, was brought to the emergency department. From his medical history, it was found that he had been using warfarin because of the coronary artery bypass operation he had undergone. His physical examination showed that he was unconscious and had anisocoria (Right>Left). In his laboratory findings, the only abnormal result was a high international normalized ratio. His cranial computed tomography (CT) image showed acute subdural hematoma on the right side and shift on the midline. Following this, he was operated and then transferred to intensive care unit (ICU). On the 15th day of stay in the ICU, the patient was still unconsciousness. Therefore, tracheostomy was planned. However, because of a short neck, the Otorhinolaryngology Department planned to perform the operation. In the operating room, under general anesthesia, a horizontal incision was made through the second and third tracheal rings. From this incision (8.0-mm Portex Soft Seal cuff; Portex Ltd, Hythe, UK), a tracheostomy cannula was placed. Before placement of the cannula, the cuff was con-

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FIGURE I. Flatted tracheostomy cannula due to TPO

trolled and it was verified that it was working properly. However, after placement of the cannula, the cuff of the cannula was not working properly; it was flat. Hence, another tracheostomy cannula, the cuff of which was also controlled before placement, that was manufactured by the same company was placed, but it was also flat (Figure I). Subsequently, another tracheostomy cannula with a thicker cuff (8.0 mm Rüsch Ultra-Tracheoflex, Rüsch GmbH, Germany) was placed through the same incision. This cannula worked properly, and the cuff was not flat. During open surgical tracheostomy, which was performed by an ENT(Ear Nose Throat) doctor, the trachea was stony hard. Another issue was the repeated perforation of the tracheostomy tube cuff, which occurred even after changing the tube during the tracheostomy procedure. After the operation, the patient was transferred to the ICU, and he died I day later. No pathological specimen was sent for medical examination, and a cervical CT scan could not be obtained; these are the limitations of this case report.

DISCUSSION

The first case of TPO during surgical tracheostomy was reported by Nikandish et al. (I). Our case might be considered the second case of TPO during surgical tracheostomy because of the repeated perforation of the tracheostomy tube cuff during surgical tracheostomy. The repeated rupture of the tracheostomy cuff could be explained by the trauma to the cuff due to the presence of bony tissue in the tracheal wall. The presence of bony tissue can be explained by the calcification and ossification observed during surgical tracheostomy.

The manifestations of TPO may be either asymptomatic or non-specific respiratory symptoms (dry cough, productive cough, hemoptysis, and dyspnea, dryness of the throat, recurrent lower respiratory tract infection, and atelectasis) (2-5). TPO patients may also experience difficult intubation or repeated tracheal tube cuff rupture (I, 2). In cases where clinical signs are present, clinical symptoms depend on the location of occurrence of lesions (3). In our case, the patient's medical history was not clear; he had been using only warfarin for coronary artery disease, which may be the reason for him falling, along with respiratory reasons, such as pulmonary arrest, airway obstruction, or hypercapnic respiratory failure.

The X-ray image obtained during TPO has no characteristics (2). In the advanced phase of the disease, narrowing or displacement of the trachea is visible, with a marked irregular outline of its walls (3). No pathological appearance was reported in the X-ray of the present case. The results of pulmonary functional tests (PFTs) are within normal ranges in mild TPO patients. Results that are not within normal ranges in PFT indicate the severity of TPO (2, 3).

A CT scan may demonstrate the special finding of multiple submucosal calcified nodules involving the anterior and lateral walls of the tracheobronchus (2-5). The main specific images in fiberoptic bronchoscopy (FOB) are sessile submucosal calcified nodules protruding into the lumen of the trachea and main bronchi, maintaining the posterior wall intact (2). The pathognomonic feature that differentiates TPO from other disorders affecting the airways, such as amyloidosis, is the intact posterior wall of the trachea in TPO (3, 4). Although imaging studies may provide a clue to the diagnosis, bronchoscopy is the most definitive diagnostic test (5). To diagnose TPO, the typical scene in FOB is described as beaded, spiculate, rock garden, or cobble-stoned like nodules, which projected into the tracheobronchus lumen, sparing the posterior wall. very pathognomonic, and a biopsy is not essential since the typical appearance of FOB is enough to make a diagnosis. (2-4). The cartilage and ossification in the submucosa, calcification, and mucosal squamous metaplasia are the characteristic histopathological findings in bronchoscopic biopsy materials (2, 5). In our case, we had planned performing FOB and a cervical CT scan, but the patient died within 24 h (before they could be performed).

Medical treatment modalities are non-specific and are offered only for symptomatic patients (2). Several therapeutic modalities, including corticosteroids, airway humidity, laser ablation, surgical resection, mechanical debulking, stent implantation at the place of narrowing, cryotheraphy, radiotherapy, removal of nodules by forceps, and surgical treatment, are performed (2-5). The optimum treatment is controversial (4).

Our patient was intubated by the 112 emergency medical service and was brought to the emergency department. After an operation for his subdural hematoma, he was transferred to the ICU. He was monitored through a mechanical ventilator. On the 15th day of stay in the ICU, the patient did not gain consciousness; hence, tracheostomy was planned. Routinely, percutaneous tracheostomy is performed for such patients, but owing to the short neck of the patient, surgical tracheostomy was performed by an ENT doctor in the operating room under general anesthesia. If percutaneous tracheostomy had been performed, it could have been more complicated.

Many TPO patients cannot be diagnosed. To diagnose TPO, the typical scene in FOB is very pathognomonic, and a biopsy is not always necessary. FOB also helps to screen the tracheal area. If bedside percutaneous tracheostomy or surgical tracheostomy is planned, FOB may be performed routinely to diagnose TPO and/or prevent complications due to percutaneous or surgical tracheostomy.

Informed Consent: Written informed consent was obtained from patient's relatives.

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CYPRUS JOURNAL OF MEDICAL SCIENCES

Case Report

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Canavan Disease: First Normocephalic Case from North Cyprus

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Canavan disease is an autosomal recessively inherited leukodystrophy characterized by white matter degeneration. The defective gene is the aspartoacylase gene that encodes the enzyme aspartoacylase. Head lag, macrocephaly, and hypotonia are the primary characteristic physical examination findings. A 6 month-old patient presented with developmental delay and normocephaly. Brain magnetic resonance imaging showed delayed myelinization at the corpus callosum, genu of the internal capsule, and posterior limb and hyperintensity of the globus pallidus, thalamus, dorsal aspect of the brain stem, corticospinal tract, and cerebellum. Magnetic resonance spectroscopy demonstrated a prominent N-acetyl aspartate peak, which is a typical pathological finding. Genetic testing revealed the presence of a homozygous c.79, G>A (p.G27R) mutation, which confirmed the diagnosis of Canavan disease. During follow-ups, the child was normocephalic, even at the 1 year visit.

Keywords: Canavan disease, normocephaly, magnetic resonance spectroscopy, genetic testing

INTRODUCTION

Canavan disease (CD) is a leukodystrophy characterized by the degeneration of white matter that is replaced by fluid, thereby causing vacuolating myelinopathy (1, 2). It is an autosomal recessively inherited disorder. The defective gene is the aspartoacylase (ASPA) gene that encodes the enzyme aspartoacylase. Aspartoacylase hydrolyses N-acetyl aspartate (NAA), providing the acetyl group to dendrocytes for myelin synthesis. Defective enzyme activity results in decreased myelin synthesis and dysmyelination. Although CD has a higher incidence in the Ashkenazi Jewish population, it can also be seen in other populations. Its incidence various between 1:200,000 and 1:400,000 in the non-Jewish population (3). The classical triad in infantile CD is hypotonia, macrocephaly, and head lag (4). In the current report, the first case of a patient with CD from North Cyprus and having normal head circumference has been presented.

CASE PRESENTATION

A 6-month-old female presented with global developmental delay and a history of generalized tonic seizures for 4 months. Her perinatal history and delivery were unremarkable. She was the first child of second-degree consanguineous parents. She was born at term without any complication. No family history of neurologic or metabolic disorder was reported. At 2 months of age, her family recognized that she was irritable, did not visually tract objects, did not laugh, and was not interested in her surrounding environment. Her physical examination indicated that she had a body weight of 6.190 g (10th percentile), body length of 63 cm (10th percentile), and head circumference of 42 cm (50th percentile). She had severe hypotonia, head lag, and hypertonicity in the extremities and would not interact socially. Brain magnetic resonance imaging (MRI) showed delayed myelinization at the corpus callosum, genu of the internal capsule, and posterior limb. MRI also showed hyperintensity of the globus pallidus, thalamus, dorsal aspect of the brain stem, corticospinal tract, and cerebellum. Subsequently, proton magnetic resonance spectrometry (MRS) revealed a prominent NAA peak on the posterior deep white matter lobe, which is considered a typical pathological finding. The findings were consistent with those observed in CD (Figure 1). The diagnosis was confirmed by genetic testing, in which a homozygous c.79, G>A (p.G27R) mutation was identified in the ASPA gene. Head circumference was within normal limits according to age at 1 year age control. No improvement was observed in developmental steps, despite lithium citrate treatment. Informed consent was taken from the parents.

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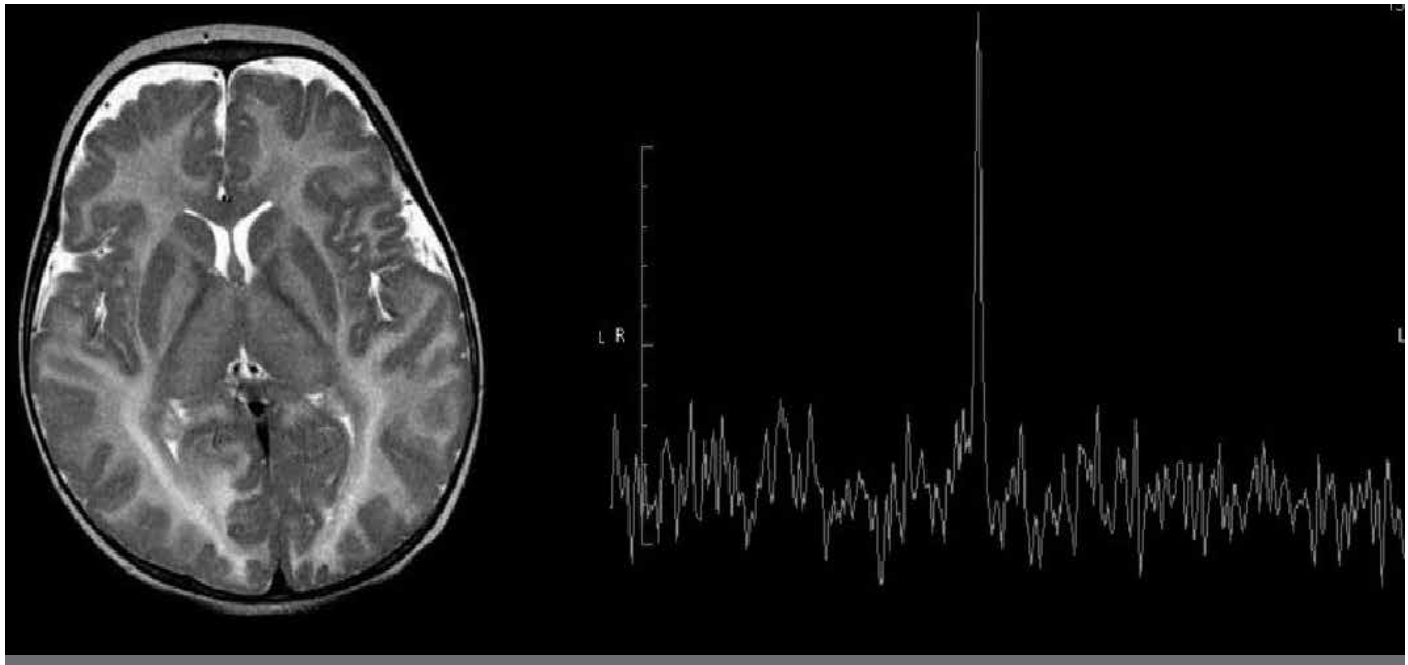

FIGURE I. MRI findings and prominent NAA peak of the presented case.

DISCUSSION

The classical triad in infantile CD in early childhood is hypotonia, macrocephaly, and head lag (4). Macrocephaly becomes evident within the first year of life, even if normocephaly is seen during the first months of life. Although macrocephaly is part of the classical triad, the presented case was normocephalic, even at the I-year follow-up visit. There are few cases of normocephaly reported in the literature (5, 6); there was a recent case of microcephaly reported in the literature (7). The presented case was normocephalic at the time of making the diagnosis and also in the subsequent follow-up visits. Macrocephaly can also be seen in other neurodegenerative disorders such as Alexander Disease and glutaric acidemia Type I that takes place in the differential diagnosis (8). Diagnosis is based on neurological findings, laboratory test results, the presence of cultured skin fibroblasts, and neuroimaging and genetic testing results.

Serum and urine NAA levels are approximately 200 times higher than those in normal age-matched individuals. Serum and urine NAA levels may normal in infants (9, I0). In the presented case, as MRI, MRS, and genetic testing confirmed the diagnosis, serum and urine NAA levels were not studied.

Brain MRI demonstrates diffuse loss of white matter including subcortical U-fibers (2, II). Bilateral globus pallidus involvement and thalamus involvement are usually observed. The putamen and caudate nucleus are not affected, which is very typical in CD. The cerebellum and brain stem tracts are also affected (I2). MRS revealed a prominent NAA peak, which is characteristic in CD. A low choline (Cho)/creatine (Cr) ratio, high myoinositol/Cr ratio, and high lactate level may be observed in some patients with CD (I2).

In the presented case, typical MRI findings and a prominent NAA peak were seen along with the normal Cho/Cr ratio (Figure I).

More than 70 mutations have been demonstrated to date in CD. Two mutations account for approximately 98% of the alleles of Ashkenazi Jewish patients, among whom the disease is highly prevalent: E285A and Y23IX. In non-Jewish patients of European origin, the A305E mutation accounts for 50% of alleles (I3). The homozygous c.79, G>A (p.G27R) mutation in the ASPA gene was detected in our patient.

Defective enzyme activity can be demonstrated via cultured skin fibroblasts. Results are highly dependent on culture conditions, but the demonstration of a lack of enzyme activity is diagnostic. As the mutation is known, the demonstration of enzyme activity was not performed via cultured skin fibroblasts. Cultured skin fibroblasts may be reserved for cases with novel mutations or for those in which mutations cannot be demonstrated.

There is a mild/juvenile form of the disease. This form usually presents in older age with mild developmental delay. It has also been demonstrated that usually, a heterozygous mutation with one mild variant and one severe variant causes residual ASPA activity (I4) that is responsible for the clinical course.

Genetic mutations may be effective on the clinical course of the disease, which is similar in the mild/juvenile form; therefore, studies evaluating genetic mutations with the clinical course of the disease are required.

There is no specific treatment for patients with CD. Human trials using lithium citrate, glyceryl triacetate, and topiramate have been documented. Lithium citrate treatment was given to our patient without obvious progress (4).

Gene therapy is one of the most promising treatment options; currently, it is being experimentally used (4). Therefore, prenatal diagnosis becomes more important. In conclusion, MRI and MRS findings are highly characteristic of CD. MRS should also be performed together with brain MRI in patients with suspect-

ed leukodystrophies even if macrocephaly is not seen. Genetic testing is important for confirming the diagnosis and for prenatal testing. In patients with a novel mutation, urinary NAA levels and skin fibroblast cultures become more important for making a definite diagnosis.

Informed Consent: Informed consent was obtained from patient'parents.

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Case Report

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Rectus Sheath Hematoma Presenting with Acute Abdominal Pain after a Severe Cough Episode

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Rectus sheath hemorrhage is a rare and often overlooked cause of acute abdominal pain. The use of appropriate imaging modalities along with rapid history learning and careful physical examination will ensure accurate diagnosis and avoid unnecessary laparotomy. Rectus sheath hematoma is often self-limited; therefore, the treatment is conservative. Surgical treatment is unavoidable in large and complicated hematomas with hemodynamic dysfunction. In this article, we present the case of a 65-year-old patient who was admitted to emergency service because of severe abdominal pain after cough episode. Conservative treatment was applied to the patient who had rectus sheath hematoma.

Keywords: Acute abdominal pain, rectus sheath hematoma, conservative treatment

INTRODUCTION

Rectus sheath hematoma (RSH) is a rare condition and is the result of the rupture of the rectus muscle fibers or the rupture of the epigastric vessels in the anterior rectus abdominis sheath and the accumulation of blood in the rectus sheath (1). It is rarely spontaneous, although it is usually has an underlying cause such as trauma, anticoagulant therapy, post-abdominal surgery, severe cough, hematologic diseases, physical exercise, pregnancy, and subcutaneous drug injections. Hematomas under the semicircular canal of the abdomen may result in a clinical picture similar to the acute abdomen clinic, leading to the irritation of the peritoneum due to the weakness of the posterior rectus sheath. Management is usually conservative because the natural course of this condition is self-limiting. Red blood cell transfusion is recommended in the presence of hemodynamic compromise or significant decrease in hemoglobin level. Invasive procedures or surgery are rarely needed for securing hemostasis and stabilizing hemodynamics. Surgical management is associated with significant morbidity due to advanced age and multiple comorbidities in these patients (2). In this article, an RSH case has been reported as a rare reason of acute abdominal pain, which appears as the result of severe coughing.

CASE PRESENTATION

A 65 year-old female patient was admitted to the emergency department because of a sudden onset of abdominal pain, following 8 hours of coughing crisis. She had history of diabetes mellitus, hypertension, and chronic obstructive pulmonary disease. The patient was on oral antidiabetic, antihypertensive, and bronchodilator therapy. She had no history of trauma, post-surgery, or anticoagulant medication. At the time of admission, blood pressure was 100/60 mmHg, pulse rate was 96/min, and body temperature was 36.7°C. Physical examination revealed periumbilical area, and right upper quadrant showed tenderness and defenses. Intestinal sounds were normoactive. Laboratory tests results revealed white blood cell count: 23,400/mm^3, hemoglobin: 12.4 g/dL, platelet count: 313,000/µL, C-reactive protein: 8.3 mg/dL, glucose: 349 mg/dL, international normalized ratio: 0.93 (range, 0.8-1.2), prothrombin time: 11.9 s (normal range, 10.5-15.5 s), activated partial thromboplastin time: 19.4 s (normal range, 22-36 s); other biochemical parameters were also found to be normal. Abdominal ultrasonography (US) revealed hypoechoic image in the abdominal wall, which extended from the right upper quadrant to midline. Computed tomography (CT) revealed hyperdense area of 7x5 cm in diameter, hematoma-compatible appearance, hemorrhage extending to the lumbar region in the right muscle tissue, densification compatible with edema, and dirty and diffuse echogenic areas in the abdominal anterior wall in the right rectus abdominal muscle (Figure 1a, b). Emergency surgical intervention was not performed on the patient who was interned with the current findings.

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The patient was administered I g ceftriaxone intravenously (two times a day). Fluid and analgesic treatment was started, and the patient was followed up closely for bleeding. There was no decline in hemogram values during the follow-up, hemodynamics was stable, and no blood replacement was performed. During the follow-up, extensive ecchymosis areas were observed in the abdominal skin (Figure 2a, b). Four days after the medical treatment, the patient's complaints had ended, and she was discharged with good health. Fifteen days later, the patient arrived at the outpatient's clinic for control and it was observed that the ecchymosis in the abdominal region had decreased. Informed consent was obtained from the patient.

DISCUSSION

RSH is an uncommon but clinically significant disease that can mimic acute abdomen. While different causes of acute abdominal pain are being investigated in the emergency service, it is often not obvious and may lead to unnecessary surgical interventions. It is usually seen in women and in their 50s (3). It accounts for 2% of the unexplained abdominal pain (4). It is mostly localized at the lower abdominal quadrant and at the right side. The rectus abdominal muscle exhibits significant dimensional changes during severe contraction and relaxation cycles due to its anatomical location and function. Tearing can occur in these superior and inferior epigastric vessels due to these severe dimensional changes (5).

Findings that are detected during the application are usually abdominal pain, ecchymosis in the abdominal wall, mass in the abdomen, decrease in hemoglobin values, nausea, vomiting, peritoneal irritation, and fever (6). Early diagnosis is essential to prevent unnecessary surgical interventions. US, CT, and magnetic resonance imaging are various methods used for diagnosis.

Although US is the first choice for diagnosis owing to its high sensitivity rates and easy and quick access, it is sometimes difficult to distinguish intra-abdominal lesions from extra-abdominal lesions in the ultrasound report. On the other hand, CT is a

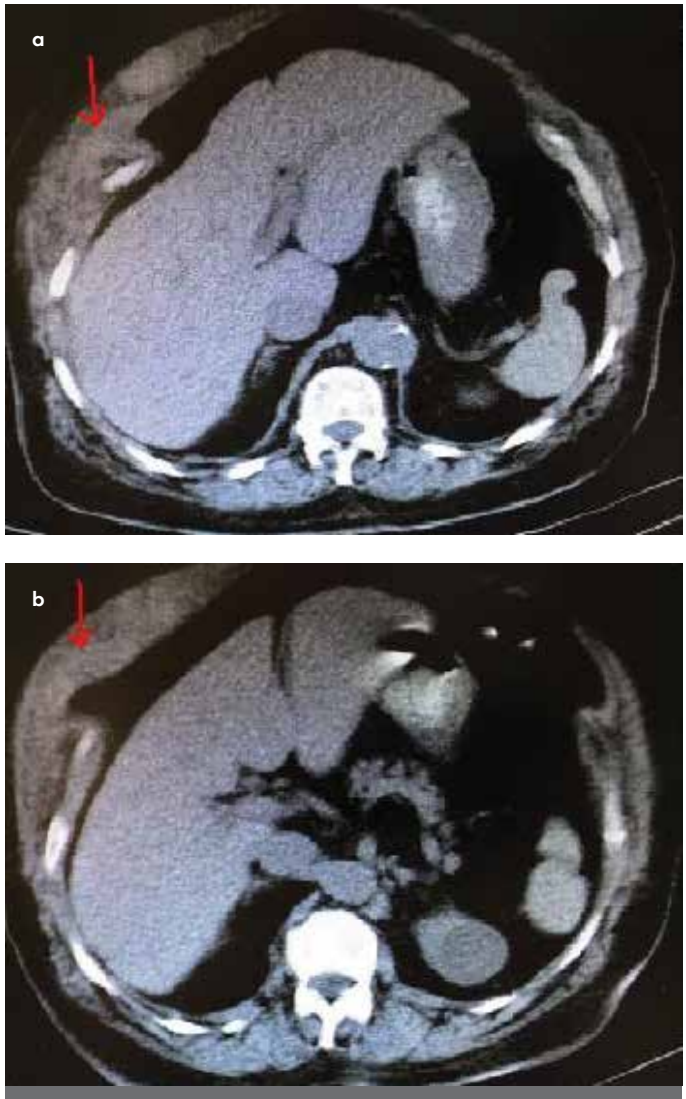

FIGURE I. a, b. Computed tomography images of the patient

FIGURE 2. a, b. Image of diffuse ecchymosis in the abdominal skin of the patient on the third day of follow-up

much superior imaging method for assessing hematoma placement, extent, and size. It is possible to classify hematomas by means of tomographic imaging. In the Type 2 hematoma, bleeding is mild and only within the muscle. In the Type 2 hematoma, hematoma is in the muscle but bleeding occurs in the space between the facial transversalis and the muscle. On the other hand, in type 3 hematoma, hemorrhage is severe and the fascia is located between the transversalis and the muscle and in front of the peritoneum and vesica urinaria. Type 2 and 3 RSH require hospitalization (7). It may take approximately 3 months for hematomas to disappear in these patients. The hematoma in our case was classified as Type 2.

Hemodynamically, conservative therapy is fundamental in stable patients. Generally, conservative treatment is available for most patients by means of resting, fluid replacement, analgesia, and blood and blood component transfusion. Bleeding in many cases limits itself. If conservative treatment is not successful, surgical treatment may be chosen; however, mortality rates are high (1). In patients with active bleeding, the hematoma is drained with surgical treatment and the bleeding vessels are ligated (8). Embolization (coil) in patients unresponsive to conservative treatment may be an alternative (9). In RSH, complications such as infection, acute renal failure, hypovolemic shock, myocardial infarction, and mesenteric ischemia can be seen in rare cases. Morbidity and mortality rates of patients who receive anticoagulant treatment, patients with larger hematomas dimensions, elderly patients, and patients with multiple comorbidities are higher. We treated our patient using conservative treatment and analgesia, and we did not encounter any complications (10).

Although RSH is a rare condition, it may cause unnecessary surgical interventions because it is often mixed with acute abdominal pain. Careful physical examination and appropriate imaging modalities allow accurate diagnosis and prevent unnecessary surgical interventions with the patient's anticoagulant use, severe cough, and subcutaneous injections. Management is usually conservative, as the natural course of this condition is self-limiting.

Informed Consent: Informed consent was obtained from the patient.

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Vaginal-Cuff Dehiscence and Evisceration after Radical Robotic Surgery for Urothelial Carcinoma of the Urinary Bladder

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Vaginal-cuff dehiscence and evisceration is defined as partial or total separation of the vaginal cuff from the protrusion of intra-abdominal content, which are generally small intestinal segments. We aimed to report a case of vaginal-cuff dehiscence after robotic laparoscopic surgery for urinary bladder malignancy and its management. A 71-year-old multiparous woman with a medical history of osteoporosis and a previous surgery for umbilical herniation presented with vaginal-cuff dehiscence 8 months after her urothelial carcinoma of the urinary bladder was surgically treated, which was followed by ongoing chemotherapy. To avoid potential complications and owing to the failure of manual reduction of the eviscerated segments, the patient underwent emergency laparotomy. The vaginal cuff was closed with coated absorbable no. 1 polyglactin sutures. This case of vaginal-cuff dehiscence after robotic laparoscopic surgery for urinary bladder malignancy adds to our knowledge of the clinical presentation and management of this condition.

Keywords: Vaginal-cuff dehiscence, evisceration, laparoscopic surgery, urothelial carcinoma

INTRODUCTION

Vaginal-cuff dehiscence (VCD) and evisceration is defined as partial or total separation of the vaginal cuff from the protrusion of intra-abdominal content, which are generally small intestinal segments (1). A higher incidence of VCD has been reported after laparoscopic procedures than after laparotomy (2). As vaginal evisceration following VCD can cause peritonitis, sepsis, and necrosis of the intestinal tract, prompt surgical and medical intervention is required (3). Here we present a case of VCD that occurred 8 months after robotic laparoscopic surgery for malignant bladder carcinoma with vaginal invasion.

CASE PRESENTATION

A 71-year-old multiparous woman with a medical history of osteoporosis and previous surgery for umbilical herniation presented with VCD 8 months after her urothelial carcinoma of the urinary bladder was treated surgically, which was followed with ongoing chemotherapy. The surgery consisted of radical cystectomy, total abdominal hysterectomy, bilateral salpingo-oophorectomy, partial vaginectomy, pelvic lymphadenectomy, intracorporeal ileal conduit creation, bilateral urethral stent placement, and urethrectomy performed by robotic laparoscopy (Da Vinci Intutive Surgical system USA) in our institution. The operation notes indicated that the rationale for the performance of hysterectomy was vaginal invasion of known malignancy, seen on pre-operative computed tomography. The vaginal cuff was sutured with coated no. 1 polyglactin 910 (Vicryl®; Figure 1).

Physical examination revealed VCD and evisceration of the intestine (approximately 80 cm of the ileal segment), but no color change or sign of necrosis indicating compromise of the blood supply. Stimulation of the intestinal segments revealed normal peristaltic movement (Figure 2).

To avoid intestinal resection due to intestinal tract necrosis, to control vascular support of the intestine, and because of unsuccessful manual reduction of the intestinal segments, we determined that laparotomy was the preferred procedure.

Under general anesthesia, a 4 cm midline incision was made. The prolapsed intestinal tract was transmitted to the abdominal cavity after sufficient cleansing with warm sterilized physiological saline solution. Vascular support and peristaltic movement of all intestinal tract segments were checked. The vaginal cuff was opened fully by pulling all intestinal

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FIGURE I. Vaginal-cuff dehİscence and evisceration

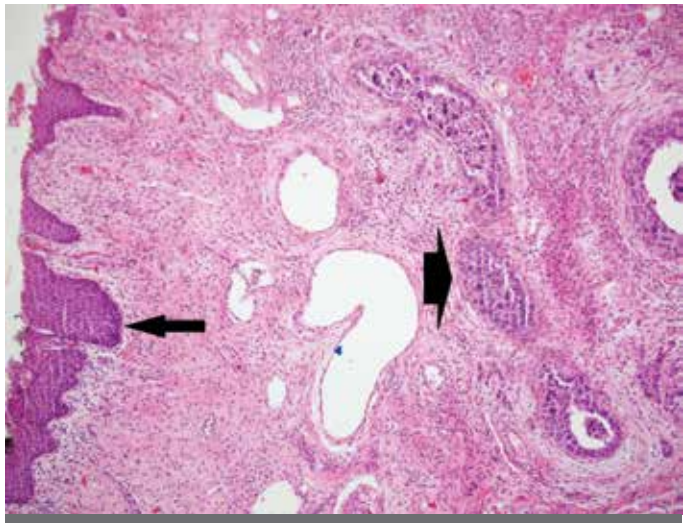

FIGURE 2. Tumor-cell infiltration in the sub-epithelial layer under the stratified squamous epithelium of the vagina (tall arrow) and atypical urothelial cells with large eosinophilic cytoplasm and large hyperchromatic nuclei with distinct nucleoli (short arrow). Hematoxylin and eosin stain, xl00.

segments to the sub-diaphragmatic zone. The vaginal cuff was held and hung up using Allis forceps, then closed using continuous no. I polyglactin 910 (Vicryl UK) sutures. Teicoplanin 400 mg (Targocid ® Gruppo Lepetit, Anagni - İtalya) was administered intravenously to prevent post-operative infection.

The patient's post-operative course was uneventful, and the drainage tube was removed on post-operative day 2. Antibiotic treatment was continued until post-operative day 7, after which the patient was discharged. Outpatient examinations performed 2 and 6 weeks post-operatively revealed that the vaginal cuff was completely intact, and the patient had no related complaint. Written informed consent was obtained from the patient who participated in this study.

DISCUSSION

VCD with evisceration is a rare complication that can necessitate emergency surgery due to the risk of intestinal tract necrosis. VCD incidences of 0.15-0.25%, 0.08-0.15%, and 0.64-1.35% after total abdominal, vaginal, and laparoscopic hysterectomy, respectively, have been reported (4, 5). In a 2010 study, 0.6% of 677 women who underwent total hysterectomy by robotic laparoscopy presented with VCD. (2) Three-fourths of these cases were related to sexual intercourse. (2) Another study revealed that vaginal evisceration complicates 35%–67% of VCD cases. (6, 7) Reported risk factors for VCD are smoking, atrophic vaginitis, poorly controlled diabetes mellitus, long-term steroid treatment, constipation, vaginal-cuff cellulitis or abscess, pelvic radiation, and immunosuppression (2, 4).

Risk factors in our patient were the use of alendronate sodium (which causes constipation) for osteoporosis, previous umbilical herniation surgery, primary bladder malignancy with related surgery and ongoing chemotherapy, valsalva maneuver due to continuous constipation, advanced age, and, probably, multiparity. The patient reported that she had no sexual intercourse after the initial operation. Another risk factor for this patient was the performance of robotic laparoscopy, which can cause thermal damage that impairs wound healing, employs laparoscopic sutures that are known to be weak, and increases abdominal pressure due to inflation with carbon dioxide. All of these factors increase the burden on the pelvic base, despite the performance of all robotic laparoscopies at our institution with a monopolar device for colpotomy, creation of incisions as rapidly as possible, and minimization of thermal damage (2). A multi-institutional analysis including 12,398 patients who underwent hysterectomy for benign and malignant disease revealed that the rate of VCD was higher in cases involving vaginal closure with laparoscopic knots (6).

VCD typically develops in the first week after hysterectomy, as a result of sexual intercourse that impacts an insufficient fusion point of the vaginal cuff (4). Patients' main complaints are atypical genital bleeding, increased vaginal discharge, and lower abdominal pain. Our patient had no sexual intercourse after the procedure and no complaint other than protrusion of the intestinal segments.

CONCLUSION

Very few cases of VCD after robotic laparoscopy have been reported, and no previously reported case has had a primary etiology of urinary bladder malignancy. This report describes such a clinical presentation, expanding knowledge about cases in which VCD can occur.

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CYPRUS JOURNAL OF MEDICAL SCIENCES

Case Report

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Type B Left Circumflex Coronary Artery With Anomalous Origin Overlooked during Catheter Angiography

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Coronary artery anomalies are anatomical differences seen in approximately 1% of the population, and patients with this condition are mostly asymptomatic. The anomalous origin of the left circumflex artery from the right sinus of valsalva is one of the most common type of anomalies. The type B of this anomaly is relatively rare. There may be a difficulties in visualizing these abnormal vessels by catheter angiography. In this case, we observed an abnormal left circumflex artery that was not previously diagnosed by catheter angiography.

Keywords: Left circumflex coronary artery, anomalous, computed tomography (CT) angiography

INTRODUCTION

Coronary artery anomalies are vascular anatomical differences seen in less than 1% of the population. The more common abnormal anatomical changes may be classified as the variations of normal (1, 2).Coronary artery anomalies are classified in various ways. When classified anatomically, the ostium, the origin and course of the artery are examined (3). The retro-aortic course of the left circumflex (LCX) artery is considered to be one of the most common coronary artery anomalies with a frequency of up to 0.67% (1, 4-6).

In this case, we present the computed tomography (CT) angiographic images of a patient with Type B anomalous LCX artery, which is relatively rare. Especially, CT angiographic images are rare in the literature because this anomaly has been mostly detected by catheter angiography in studies with large patient populations.

CASE PRESENTATION

A 63 year-old female patient had angina pectoris caused by physical activity. She had been referred to the radiology clinic for cardiac CT angiography. Written consent was obtained from the patient before the examination. The examination was performed in the 256-detector multislice CT scanner (Somatom Definition Flash, Siemens Healthcare, Erlangen, Germany) with a cross-sectional thickness of 0.6250625 mm using the ECG gating method. The images were evaluated using syngo.via VB10B (Siemens Healthcare GmbH, Erlangen, Germany). Overall, 95 mL intravenous iodinated-contrast agent (iohexol, *Omnipaque 350* mg/mL, *GE Healthcare, Princeton, New Jersey*) was administered to visualize the coronary arteries. Catheter angiography was performed in another medical center abroad five months before the CT angiography examination in our clinic. The prior examination failed to show the abnormal LCX artery. CT angiography showed the LCX artery with thin calibration originating from the right sinus valsalva with the right coronary artery (RCA) (Figure 1). Retro-aortic course of the abnormal LCX artery was well visualized on both cross-sectional and volume-rendered images (Figure 2- 3). The origin of this artery was very close to that of RCA. Abnormal LCX artery was assessed as a branch that separated from the proximal of RCA. The proximal segment of the left main coronary artery (LMCA) was longer than anticipated and the bifurcation to LCX and left anterior descending (LAD) arteries was not seen (Figure 4). In this hypoplastic LCX artery case, the lateral wall of the left ventricle was vascularized by the well-developed diagonal branches of LAD and posterolateral branches of RCA.

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DISCUSSION

The anomalous origin of LCX artery and its retro-aortic course is usually considered as one of the benign anomalies of the coronary artery tree in the absence of atherosclerosis (I, 4). Non-visualization of the abnormal LCX artery in catheter angiography in this case did not result in any undesirable results for the patient. Because CT angiography showed no significant atherosclerotic changes in this thin-calibrated artery. However, the fact that coronary artery anomalies are not known before the operation, especially in patients undergoing cardiac valve surgery, may lead to iatrogenic damage to these arterial structures (3, 7). Suspicious findings in terms of abnormal LCX artery are the absence of its visualization, lack of perfusion in the left lateral wall, and a LMCA with a non-branching, long proximal segment after the injection of the contrast medium into LMCA in catheter angiography (4, 5). Contrast medium injections into RCA may sometimes not show an abnormal LCX artery, as in our patient. To avoid this, the tip of the catheter needs to be moved closer to the ostium or to the more posterior part of the sinus valsalva (4, 8). In a study ana-

FIGURE I. On the sagittal oblique maximum intensity projection image, arrows, with names beside, indicate the RCA and anomalous LCX artery. LCX artery arises as the first branch of RCA from the proximal segment, very close to ostium

FIGURE 2. On the axial oblique maximum intensity projection image at the level of sinus valsalva, arrow, with name beside, shows the retro-aortic course of the anomalous LCX artery

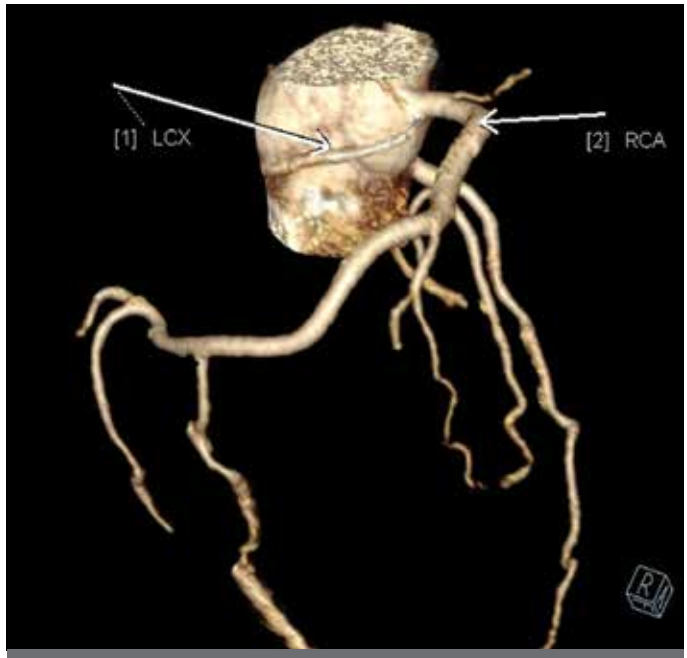

FIGURE 3. Arrows, with names beside, indicate the anomalous LCX artery and RCA originating from the right sinus valsalva on the right anterior view of volume-rendered image of coronary arteries (the heart is isolated automatically). Retro-aortic course of thin LCX artery may be seen clearly

FIGURE 4. Arrow, with name beside, indicates the LAD originating from the left sinus valsalva on the left posterior view of volume-rendered image of coronary arteries (the heart is isolated automatically). Note that the LMCA has a long and non-branching proximal segment

lyzing 20 abnormally originating LCX arteries, this anomaly was classified into three types (5). In type A, RCA and LCX have separate ostiums in right sinus of valsalva, whereas in type B, the LCX artery is a discrete branch of RCA. In type C, two arteries have a common ostium. The anomaly in our case matches to the type B. In our case, contrast filling in the abnormal LCX artery may have been prevented by the catheter itself because of location of origin as very close to the RCA ostium. In addition, a slight contrast enhancement may have not been recognized in the two-dimensional views because of its hypoplastic structure. It may be difficult to distinguish between the absence of LCX artery and the LCX artery with anomalous origin by catheter angiography in such types because in the case of hypoplastic LCX artery, the left ventricle lateral wall may be vascularized by branches from the RCA and LAD, as in the absence of LCX artery (7). As shown in our case, CT angiography is a non-invasive and successful imaging modality for detecting such troublesome or complex anomalies (9). In a published case, catheter angiography showed the LCX artery arising from the right sinus of valsalva; however, the proximal course of the artery was not assessed precisely and CT angiography was performed (10).

In conclusion, the frequency of the coronary artery anomalies may be higher than the rates determined by catheter angiography. CT angiography can be used as a first-line imaging method especially in young patients suspected of coronary artery anomalies and as a supplementary imaging method to be aware of iatrogenic hazards before cardiac surgery is performed.

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Letter to Editor

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Iatrogenic Huge Colon Perforation during Colonoscopy

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Dear Editor:

Colonoscopy is accepted as the gold standard approach for the assessment of colorectal diseases. It has been associated with various complications, and perforation is the most common complication (1). Iatrogenic perforation rates during colonoscopy ranges between 0.005% and 0.63%, with a larger number of patients requiring laparotomy for repair. Causes of colonoscopic perforation include blunt trauma to the colonic wall, barotrauma from air insufflation, inadvertent endoscopic resection, or thermal damage (1). An et al. (2) reported that in the management of colonic perforation, perforation size >15 mm is a critical indicator for the conversion from non-surgical to surgical procedures. Therefore, professional skill and education level of the endoscopist come into prominence.

Here, we report the case of a 52-year-old woman who experienced sigmoid perforation during diagnostic colonoscopy. The diagnosis of perforation was made on the basis of clinical presentation, physical examination, and radiological evidence, such as detection of free air on direct radiography (Figure 1). The patient was taken up for abdominal exploration. There was no fecal matter in the peritoneal cavity. Local contamination was minimal. The perforation site was inspected, and a sigmoid colon perforation of 4-5 cm was recognized (Figure 2). Resection with primary anastomosis was performed. The postoperative course was uneventful and the patient was discharged on postoperative day 7.

To have standard performance, endoscopists must have performed at least 25-30 flexible sigmoidoscopies and 200 colonoscopies (3). Qualification benchmarks for gastrointestinal endoscopic interventions are assessed on the premise of the number of procedures performed. Discussion

FIGURE 1. The patient with massive abdominal distension.

FIGURE 2. Abdominal radiograph demonstrating large-volume pneumoperitoneum.

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FIGURE 3. Operative image showing the sigmoid colon perforation.

is frequently about "Which specialist should do colonoscopy?" In our opinion, this is a meaningless question as long as good education is provided and quality standards are met. Colonoscopy performed by a gastroenterologist, internist, or surgeon reduces the risk of colorectal cancer death; moreover, the hazard for colon perforation is the least of all when it is performed by well-trained endoscopist. Cecal intubation rate of >90%, adequate bowel preparation, post polypectomy bleeding rate of <0.5%, and perforation rate of <0.1% are all quality indicators for colonoscopy. Polypectomy and adenoma detection rates are additional essential quality indicators; however, there is no consensus on what the appropriate targets should to be. There is insufficient evidence to suggest a minimum withdrawal time from the cecum (4, 5).

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