

An Assessment of the 100 Most Frequently Cited Articles Related to Bicuspid Aortic Valve in the Literature

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BACKGROUND/AIMS

Bicuspid aortic valve disease may cause both aortic stenosis and regurgitation; therefore, it manifests as different symptoms. Aortic stenosis in patients with bicuspid aortic valve exhibits ambiguous hemodynamic effects; moreover, it may remain asymptotically until the effective orifice area is narrowed below 1.5–2 cm². In this study, we aimed to evaluate 100 articles related to bicuspid aortic valve that have been most frequently cited in the literature.

MATERIAL and METHODS

The study was performed using advanced mode of the search engine server Institute for Scientific Information Web of Science. For this purpose, the words “TS=bicuspid or TI=bicuspid” were reviewed. The search was carried out, and the 100 most cited articles were determined. The total and annual cite count for each article and information about the authors and the journals were determined via WOS and PubMed.

RESULTS

The mean cite count of the 100 most cited articles was found to be 238.10±227.48. The annual cite counts of the studies varied from 4 to 185, and the mean value was calculated as 20.93±25.25. The first 3 subjects were clinical BAV (41%), pathology of BAV (15%), and genetics of BAV (15%). There was no statistically significant difference between the continent of the corresponding author and overall and annual cite counts. In addition, no statistically significant difference was observed between the journal's continent and overall and annual cite counts (p>.05).

CONCLUSION

This study is the first in the literature to identify the 100 most cited articles related to BAV. The majority of these studies were based on clinical evaluation of BAV. We found an increase in the number of studies on percutaneous transcatheter interventions over the last 5 years.

Keywords: Bicuspid aortic valve, bibliometrics, aortic aneurysm, aortic stenosis

INTRODUCTION

In the current era, several studies have been conducted by different international or national institutes and surgical disciplines to determine the most cited articles for medical sciences (1-4). When a scientific paper references another scientific paper, it is identified as “cited.” The scientific articles that had been a resource of or that strengthened the findings are accepted as cited if they are referred in any part of another scientific paper. The impact factor of the article is evaluated according to the frequency of citation. The more cited articles and the journals with a higher impact factor are considered more qualified (5, 6).

The first bibliographic study on the 100 Citation Classics From the Journal of the American Medical Association published in the Journal of the American Medical Association was written by Garfield et al. (5). Since then, numerous stud-

ies investigating the most cited articles have been presented not only in general medical journals but also in specialized journals (7). For example, Ahmad et al. (8) presented the 100 most cited articles on bariatric surgery between 1945 and 2014, and Amina et al. (9) reported the 50 most frequently cited articles on bariatric and endocrinological surgery published between 1950 and 2000.

No study has investigated the relationship between bicuspid aortic valve (BAV) and the citation number of published articles related to this issue. BAV disease may cause both aortic stenosis and regurgitation; therefore, it manifests as different symptoms. Aortic stenosis in patients with BAV exhibits ambiguous hemodynamic effects; moreover, it may remain asymptotically until the effective orifice area is narrowed below 1.5–2 cm² (9–13). However, a valve replacement should be performed in high-risk patients with severe aortic stenosis because these patients rapidly become symptomatic. On the other hand, aortic regurgitation may occur primarily or as a consequence of BAV. Calcification, myxomatous degeneration, infective endocarditis, rheumatic fever, and some drugs (e.g., fenfluramine, phentermine) may also cause aortic regurgitation (13–17). This complex is identified as bicuspid aortic syndrome, and the treatment algorithms are developed according to guidelines (18–20).

In this study, we aimed to determine the 100 most cited articles on BAV and evaluate these studies according to authors' characteristics, the origin of countries, institutes, and the journals that have published these articles via the Institute for Scientific Information (ISI) Web of Science (WOS) search engine.

MATERIAL and METHODS

This study was conducted after ethical approval (number: 377-GOA 2018/03-09) was obtained and was performed using advanced mode of ISI WOS search engine. The words "TS=bicuspid or TI=bicuspid" were searched, and articles published between 1975 and 2018 were included. The search was done on June 14, 2018. Consequently, the 100 most cited articles related to BAV that have been published in international journals were identified. The list was created to evalu-

ate the 100 most cited articles related to BAV in the literature. The first authors of each article were reviewed, and it was checked whether they were a part of another article in the same list. The overall and annual cite count and information about authors, articles, and journals were determined via WOS and PubMed. Letters to the Editor and case reports were excluded from the study.

Statistical Analysis

Statistical analyses were performed using the SPSS (IBM SPSS Corp.; Armonk, NY, USA) version 20.0 software. Categorical data are presented in absolute (n) and relative (%) frequencies. All data are expressed as the mean value±standard deviation. For the comparison of the groups, Kruskal Wallis and Mann-Whitney U tests were performed. $P < .05$ was considered statistically significant in all statistical tests.

RESULTS

A total of 4,130 studies that have been published between 1975 and 2018 were found after a search using the keywords "TS=bicuspid or TI=bicuspid" in the WOS search engine. Among all the 100 most cited articles list, the most cited article had 2,001 citations and the less cited had 108 citations. We did not cite all the 100 articles because we have included them in the last citation. The information about the first authors of the 100 articles on BAV is shown in Table 1.

The analysis of institutions of the corresponding authors is presented in Table 2.

The most cited article was written by Hoffman et al. (22). The article was titled "The Incidence of Congenital Heart Disease" and was published in the Journal of the American College of Cardiology in 2002. The first 3 journals where the 100 articles had been published were found to be Circulation (18%), Journal of The American College of Cardiology (17%), and Journal of Thoracic and Cardiovascular Surgery (11%). In Table 3, citation numbers and mean values of the 100 articles are listed. When the researchers were investigated according to their nationality, the USA (56%), Canada (17%), and Germany (7%) were listed on top. Moreover, 22% of the authors were non-European citizens. All the 100 articles had been published in journals indexed in the science citation index.

However, there was a significant relation between the publishing year and the mean annual citation number; in particular, the articles that had been published after 2010 had remarkably higher citation number ($p < .05$). Type of the papers had a significant association with citation numbers and annual citation numbers; in particular, the Guideline-type articles had much more total citation and annual citation numbers ($p < .05$). Articles written by non-surgeon authors had higher annual citation numbers than the articles in which the first author was a surgeon. In addition, there was a significant difference related to annual citation numbers among journals ($p < .05$). For instance, USA- and UK-originated journals had remarkably higher annual citation numbers when study subjects were considered. Guideline-type articles also had significantly higher total and annual citation numbers ($p < .05$). The characteristics of the 100 articles related to BAV are presented in Table 4.

Main Points:

- This is the first study analyzing BAV from bibliometric point of view. A majority of these studies have investigated BAV clinically.
- There was no difference observed between the continent of the first author and the annual citation number. Moreover, no difference was observed between the continent of the journal and the annual citation number.
- The articles that had been published after 2010 had remarkably higher citation number ($p < .05$); this was interpreted as an increase in interventional cardiology publications for BAV syndrome.
- We believe that the citation numbers of studies on innovative materials (e.g., sutureless, bioprosthesis valves, etc.) for aortic valve will constantly increase in the following years.

TABLE I. The first authors of the 100 most cited articles about BAV in the literature

	Frequency	Percent		Frequency	Percent
Nishimura, RA	3	3,0	Januzzi, JL	1	1,0
Warmes, CA	3	3,0	Keane, MG	1	1,0
David, TE	2	2,0	Lee, TC	1	1,0
Aicher, D	2	2,0	Lopez, L	1	1,0
Fedak, PWM	2	2,0	Macatee, TL	1	1,0
Hoffman, JIE	2	2,0	Mahadevia, R	1	1,0
Hope, MD	2	2,0	Markl, M	1	1,0
Hinton, RB	2	2,0	Mazzanti, L	1	1,0
Maron, BJ	2	2,0	McKellar, SH	1	1,0
Michelena, HI	2	2,0	Mohamed, SA	1	1,0
Loeys, BL	1	1,0	Mohler, ER	1	1,0
Andelfinger, G	1	1,0	Nataatmadja, M	1	1,0
Barker, AJ	1	1,0	Niessen, K	1	1,0
Basso, CB	1	1,0	Nistri, S	1	1,0
Ben S	1	1,0	Niwa, K	1	1,0
BEPPU, S	1	1,0	Nkomo, VT	1	1,0
Biben, C	1	1,0	Okamoto, RJ	1	1,0
Biner, S	1	1,0	Pachulski, RT	1	1,0
Bissell, MM	1	1,0	Pelliccia, Antonio	1	1,0
Bonderman, D	1	1,0	Pierpont, Mary Ella	1	1,0
Boodhwani, M	1	1,0	Regitz-Zagrosek, Vera	1	1,0
Boon, RA	1	1,0	Roberts, CS	1	1,0
Borger, MA	1	1,0	Roberts, WC	1	1,0
Braverman, AC	1	1,0	Robicsek, F	1	1,0
Caira, FC	1	1,0	Russo, CF	1	1,0
Casselmann, FP	1	1,0	Sabet, HY	1	1,0
Combs, MD	1	1,0	Schaefer, B. M.	1	1,0
Cripe, L	1	1,0	Sedmera, D	1	1,0
David, Tirone E.	1	1,0	Sievers, HH	1	1,0
Davies, Ryan R.	1	1,0	Siu, SC	1	1,0
De Sa, M	1	1,0	Snider, P	1	1,0
Della Corte	1	1,0	Svensson, LG	1	1,0
Ergin, MA	1	1,0	Sybert, VP	1	1,0
Fahed, Akl C.	1	1,0	Tadros, TM	1	1,0
Feng, QP	1	1,0	Takach, TJ	1	1,0
Fernandes, SM	1	1,0	Tang, GHL	1	1,0
Garg, V	1	1,0	Topaz, O	1	1,0
Gotzsche, CO	1	1,0	Tzemos, N	1	1,0
Gridley, Thomas	1	1,0	Verma, S	1	1,0
Hahn, RT	1	1,0	Von Kadolitsch, Y	1	1,0
Huntington, K	1	1,0	Ward, C	1	1,0
Ikonomidis, JS	1	1,0	Wijesinghe, N	1	1,0
Immer, FF	1	1,0	Yasuda, H	1	1,0
Lung, B	1	1,0	Zegdi, R	1	1,0
			Total	100	100,0

TABLE 2. The institutes of the 100 most cited articles about BAV in the literature

	Frequency	Percent		Frequency	Percent
Mayoclinic	11	11,0	Hosp Univ Penn	1	1,0
Univ Toronto	10	10,0	Indiana Univ	1	1,0
Northwestern Univ	4	4,0	Italian Natl Olymp Comm	1	1,0
Univ Calif San Francisco	4	4,0	Jackson Lab	1	1,0
Cincinnati Childrens Hosp	3	3,0	London Hlth Sci Ctr	1	1,0
Washington Univ	3	3,0	Mt Sinai Med Ctr	1	1,0
Cleveland Clin	2	2,0	Natl Cardiovasc Ctr	1	1,0
Baylor Univ	2	2,0	NHLBI	1	1,0
Harvard Univ	2	2,0	Niguarda Hosp	1	1,0
Med Univ S Carolina	2	2,0	RES INST	1	1,0
Minneapolis Heart Inst Fdn	2	2,0	St. Luke's International Hospital	1	1,0
Univ British Columbia	2	2,0	Texas Heart Inst	1	1,0
Univ Cincinnati	2	2,0	UKSH, Klin Herzchirurg	1	1,0
Univ Ottawa	2	2,0	Univ Bologna	1	1,0
Univ Padua	2	2,0	Univ Hosp Bern	1	1,0
Univ Western Ontario	2	2,0	Univ Hosp Hamburg Eppendorf,	1	1,0
Aarhus Univ Hosp	1	1,0	Univ Hosp Homburg	1	1,0
Beth Israel Deaconess Med Ctr	1	1,0	Univ Hosp Saarland	1	1,0
Boston Univ	1	1,0	Univ Massachusetts	1	1,0
Carolinas Med Ctr	1	1,0	Univ Miami	1	1,0
Cedars Sinai Med Ctr,	1	1,0	Univ Naples	1	1,0
Charite, Inst Gender Med	1	1,0	Univ New S Wales	1	1,0
Childrens Hosp & Med Ctr, Div Dermatol, Seattle	1	1,0	Univ Oxford	1	1,0
Childrens Hosp Montefiore	1	1,0	Univ S Manchester	1	1,0
Clin Univ St Luc	1	1,0	Univ Schleswig Holstein	1	1,0
Columbia Univ	1	1,0	Univ Texas, SW Med Ctr	1	1,0
Gargetown Univ	1	1,0	Univ Utah	1	1,0
Ghent Univ Hosp	1	1,0	Univ Vienna	1	1,0
Goethe Univ Frankfurt	1	1,0	University of Melbourne	1	1,0
Hop Europeen Georges Pompidou	1	1,0	University of Minnesota	1	1,0
Hop Xavier Bichat	1	1,0	Total	100	100,0

DISCUSSION

Owing to the development in intervention methods and new-generation aortic valves, indications in the guidelines and management are being updated consistently. However, contemporary studies are needed to obtain better knowledge about bicuspid aortic syndrome. This study is the first study analyzing BAV from bibliometric point of view. A majority of these studies have investigated BAV clinically. There was no difference observed between the continent of the first author and the annual citation number. Moreover, there was no difference between the continent of the journal and the annual citation number. The articles that had been published after 2010 had remarkably higher citation numbers ($p < .05$); this was interpreted as an increase in interventional cardiology publications related to BAV syndrome.

Aortic stenosis is the most common valvular disease in developed countries (17-19). The underlying etiology may be a degenerative disease, BAV, or rheumatic cardiac disease. However, the etiology of BAV is still unclear (17). Early calcium deposit occurs; subsequently, genetic predisposition and BAV morphology lead to increased physical stress on the leaflets. Further studies may clarify the underlying mechanisms of this complex disease, delaying the progress at early stages. Abnormal valvular structure, turbulence, fibrosis, rigidity, and calcification lead to stenosis in valvular orifice; thus, valvular degeneration increases. BAV is the most common cause of congenital calcific aortic stenosis and is reported with a rate of 2% in the general population (1-4). Progressive calcification often develops in the fifth and sixth decades, is more common in valve structure with single commissure, and has male dominance (19-22). However, it may coexist with an aneurysm related to medial degeneration.

TABLE 3. Overall and mean annular citation numbers and the mean of the 100 most cited articles about BAV in the literature

Article	Year	Authors	Citation number	Mean Annular citation number
1 The incidence of congenital heart disease Journal Of The American College Of Cardiology 2002; 39:1890-00 .	2002	: Hoffman, JIE; Kaplan, S	1990	117,06
2 2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease: Executive Summary.2014;63:2438-88	2014	Nishimura, Rick A.; Otto, Catherine M.; Bonow, Robert O.; et al.	911	182,20
3 Mutations in NOTCH1 cause aortic valve disease 437:270-74.	2005	Garg, V; Muth, AN; Ransom, JF; et al.	698	49,86
4 ACC/AHA 2008 Guidelines For The Management Of Adults With Congenital Heart Disease Journal Of The American College Of Cardiology 2008;23:E1-I21 .	2008	Warnes, Carole A.; Williams, Roberta G.; Bashore, Thomas M.; Et Al.	632	57,45
5 The revised Ghent nosology for the Marfan syndrome journal Of Medical Genetics 2010;47:476-85.	2010	Loeys, Bart L.; Dietz, Harry C.; Braverman, Alan C.; et al.	590	65,56
6 ESC Guidelines on the management of cardiovascular diseases during pregnancy The Task Force on the Management of Cardiovascular Diseases during Pregnancy of the European Society of Cardiology (ESC) European Heart Journal 2011;32:3147-97.	2011	Regitz-Zagrosek, Vera; Lundqvist, Carina Blomstrom; Borghi, Claudio; et al.	541	67,63
7 2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines Circulation 2014;129:E121-E643 .	2014	Nishimura, Rick A.; Otto, Catherine M.; Bonow, Robert O.; et al.	540	108,00
8 ACC/AHA 2008 Guidelines for the Management of Adults With Congenital Heart Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Develop Guidelines on the Management of Adults With Congenital Heart Disease): Developed in Collaboration With the American Society of Echocardiography, Heart Rhythm Society, International Society for Adult Congenital Heart Disease, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons Circulation. 2008;118:E714-	2004,00	Warnes, Carole A.; Williams, Roberta G.; Bashore, Thomas M.; et al.	537	48,82
9 Genetic basis for congenital heart defects: Current knowledge - A scientific statement from the American heart association congenital cardiac defects committee, council on cardiovascular disease in the young Circulation 2007;115:3015-38	2007	Pierpont, Mary Ella; Basson, Craig T.; Benson, D. Woodrow, Jr; et al.	445	37,08
10 Recommendations for Quantification Methods During the Performance of a Pediatric Echocardiogram: A Report From the Pediatric Measurements Writing Group of the American Society of Echocardiography Pediatric and Congenital Heart Disease Council journal Of The American Society Of Echocardiography.2010;23:465-95.	2010	Lopez, Leo; Colan, Steven D.; Frommelt, Peter C.; et al.	411	45,67
11 Clinical and pathophysiological implications of a bicuspid aortic valve Circulation2002;106:900-4.	2002	Fedak, PWM; Verma, S; David, TE; et al.	392	23,06
12 Clinical significance of the bicuspid aortic valve Heart 2000;83:81-85	2000	Ward, C	366	19,26
13 Prevalence of congenital heart disease By: Hoffman, JIE; Kaplan, S; Libberthson, RR American Heart Journal 2004;147:425-39 .	2004	Hoffman, JIE; Kaplan, S; Libberthson, RR	365	24,33
14 Frequency by decades of unicuspid, bicuspid, and tricuspid aortic valves in adults having isolated aortic valve replacement for aortic stenosis, with or without associated aortic regurgitation Circulation 2005;111:920-25	2005	Roberts, WC; Ko, JM	355	25,36
15 2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease: Executive Summary A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines Circulation2014;129:2440-92 .	2014	Nishimura, Rick A.; Otto, Catherine M.; Bonow, Robert O.; et al	334	66,80
16 Bicuspid Aortic Valve Disease Journal Of The American College Of Cardiology2010;55:2789-2800.	2010	Siu, Samuel C.; Silversides, Candice K.	307	34,11
17 A classification system for the bicuspid aortic valve from 304 surgical specimens Journal Of Thoracic And Cardiovascular Surgery2007;133:1226-33	2007	Sievers, Hans-H.; Schmidtke, Claudia	299	24,92
18 Bicuspid aortic valve is heritable Journal Of The American College Of Cardiology 2004;44:138-143	2004	Cripe, L; Andelfinger, G; Martin, LJ; et al.	292	19,47
19 Aortic root dilatation in young men with normally functioning bicuspid aortic valves Heart1999;82:19-22.EART	1999	Nistri, S; Sorbo, MD; Marin, M; et al.	285	14,25

TABLE 3. Overall and mean annular citation numbers and the mean of the 100 most cited articles about BAV in the literature (Continued)

Article	Year	Authors	Citation number	Mean Annular citation number
20 Prevalence of sudden cardiac death during competitive sports activities in Minnesota high school athletes <i>Journal Of The American College Of Cardiology</i> 1998;32:1881-84.	1998	Maron, BJ; Ohman, TE; Aeppli, D	275	13,10
21 Structural abnormalities of great arterial walls in congenital heart disease - Light and electron microscopic analyses <i>Circulation</i> 2001;103:393-400.	2001	Niwa, K; Perloff, JK; Bhuta, SM; et al.	271	15,05
22 Association Of Aortic Dilatation With Regurgitant, Stenotic And Functionally Normal Bicuspid Aortic Valves <i>Journal Of The American College Of Cardiology</i> 1992;19:283-88.	1992	Hahn, Rt; Roman, Mj; Mogtader, Ah; et al.	253	9,37
23 Incidence of Aortic Complications in Patients With Bicuspid Aortic Valves <i>Journal Of The American Medical Association</i> 2011;306:1104-12.	2011	Michelena, Hector I; Khanna, Amber D; Mahoney, Douglas; et al.	244	30,50
24 Notch signaling in vascular development and physiology <i>Development</i> 2007;134:2709-18.	2007	Gridley, Thomas	246	20,50
25 Outcomes in adults with bicuspid aortic valves: Tzemos, Nikolaos; Therrien, Judith; Yip, James; et al. <i>Journal Of The American Medical Association</i> 2008;300:1317-25.	2008	Tzemos, Nikolaos; Therrien, Judith; Yip, James; et al.	238	21,64
26 Bicuspid aortic valves are associated with aortic dilatation out of proportion to coexistent valvular lesions <i>Circulation</i> 2000;102:35-39.	2000	Keane, MG; Wiegers, SE; Plappert, T; et al.	238	12,53
27 Histologic abnormalities of the ascending aorta and pulmonary trunk in patients with bicuspid aortic valve disease: Clinical relevance to the Ross procedure <i>Journal Of Thoracic And Cardiovascular Surgery</i> 1999;118:588-96.	1999	de Sa, M; Moshkovitz, Y; Butany, J; et al.	237	11,85
28 Vascular matrix remodeling in patients with bicuspid aortic valve malformations: Implications for aortic dilatation <i>Journal Of Thoracic and Cardiovascular Surgery</i> 2003;126:797-806.	2003	Fedak, PWM; de Sa, MP; Verma, S; et al.	236	14,75
29 The adult with congenital heart disease - Born to be bad? <i>Journal Of The American College Of Cardiology</i> 2005;46:1-8	2005	Warnes, CA	227	16,21
30 Dilatation of the pulmonary autograft after the Ross procedure, LOUISIANA Date: APR 18-21, 1999 Sponsor(s): Amer Assoc Thorac Surg <i>Journal Of Thoracic and Cardiovascular Surgery</i> 2000;119:210-18	2000	David, TE; Omran, O; Ivanov, J; et al	223	11,74
31 Cardiac septal and valvular dysmorphogenesis in mice heterozygous for mutations in the homeobox gene <i>Nkx2-5</i> <i>Circulation Research</i> 2000;87:888-95	2000	Biben, C; Weber, R; Kesteven, S; et al.	217	11,42
32 A comparison of outcomes of mitral valve repair for degenerative disease with posterior, anterior, and bileaflet prolapse <i>Journal Of Thoracic and Cardiovascular Surgery</i> 2005;130:1242-49	2005	David, TE; Ivanov, J; Armstrong, S; et al.	213	15,21
33 Ascending Aortic Dilatation Associated With Bicuspid Aortic Valve Pathophysiology, Molecular Biology, and Clinical Implications <i>Circulation</i> 2009;119:880-90.	2009	Tadros, Thomas M; Klein, Michael D; Shapira, Oz M.	210	21,00
34 Should the ascending aorta be replaced more frequently in patients with bicuspid aortic valve disease? <i>Journal Of Thoracic And Cardiovascular Surgery</i> 2004;128:677-83.	2004	Borger, MA; Preston, M; Ivanov, J; et al.	209	13,93
35 Human degenerative valve disease is associated with up-regulation of low-density lipoprotein receptor-related protein 5 receptor-mediated bone formation <i>Journal Of The American College Of Cardiology</i> 2006;47:1707-11.	2006	Caira, FC; Stock, SR; Gleason, TG; et al.	208	16,00
36 Bicuspid Aortic Valve: Four-dimensional MR Evaluation of Ascending Aortic Systolic Flow Patterns <i>Radiology</i> 2010;255:53-61.	2010	Hope, Michael D; Hope, Thomas A; Meadows, Alison K; et al.	206	22,89
37 Natural history of asymptomatic patients with normally functioning or minimally dysfunctional bicuspid aortic valve in the community <i>Circulation</i> 2008;117:2776-84.	2008	Michelena, Hector I; Desjardins, Valerie A; Avierinos, Jean-Francois; et al	205	18,64
38 Extracellular matrix remodeling and organization in developing and diseased aortic valves <i>Circulation Research</i> 2006;98:1431-38.	2006,00	Hinton, RB; Lincoln, J; Deutsch, GH; et al.	206	15,85
39 Characterizing the young patient with aortic dissection: Results from the international registry of aortic dissection (IRAD) <i>Journal Of The American College Of Cardiology</i> 2004;43:665-69. Volume: 43 Issue: 4 Pages: 665-669	2004	Januzzi, JL; Isselbacher, EM; Fattori, R; et al.	200	13,33
40 Aortic dissection in pregnancy: Analysis of risk factors and outcome <i>Annals Of Thoracic Surgery</i> 2003;76:309-14.	2003	Immer, FF; Bansi, AG; Immer-Bansi, AS; et al.	198	12,38

TABLE 3. Overall and mean annular citation numbers and the mean of the 100 most cited articles about BAV in the literature (Continued)

Article	Year	Authors	Citation number	Mean Annular citation number
41 Congenitally bicuspid aortic valves: A surgical pathology study of 542 cases (1991 through 1996) and a literature review of 2,715 additional cases Mayo Clinic Proceedings 1999;74:14-26.	1999	Sabet, HY; Edwards, WD; Tazelaar, HD; et al.	196	9,80
42 Heart Valve Development Regulatory Networks in Development and Disease Circulation Research 105:408-21.	2009	Combs, Michelle D; Yutzey, Katherine E.	195	81950
43 Genetics of Congenital Heart Disease The Glass Half Empty Circulation Research 2013;112:707-20.	2013	Fahed, Akl C.; Gelb, Bruce D; Seidman J. G.; et al.	192	32,00
44 Abnormal aortic valve development in mice lacking endothelial nitric oxide synthase. Circulation 2000;101:2345-48.	2000	Lee, TC; Zhao, YD; Courtman, DW; et al.	191	10,05
45 Mechanisms underlying aortic dilatation in congenital aortic valve malformation Circulation 1999;99:2138-43	1999	Bonderman, D; Gharehbaghi-Schnell, E; Wollenek, G; et al.	189	9,45
46 The bicuspid aortic valve Current Problems In Cardiology 2005;30:470-522.	2005	Braverman, AC; Guven, H; Beardslee, MA; et al	188	13,43
47 The bicuspid aortic valve: an integrated phenotypic classification of leaflet morphology and aortic root shape Heart 2008;94:1634-38.	2008	Schaefer, B. M.; Lewin, M. B.; Stout, K. K.; et al.	183	16,64
48 4D flow MRI: journal Of Magnetic Resonance Imaging 2012;36:1015-36.	2012	Markl, Michael; Frydrychowicz, Alex; Kozerke, Sebastian; et al.	183	26,14
49 A prospective study to assess the frequency of familial clustering of congenital bicuspid aortic valve Journal Of The American College Of Cardiology 1997;30:1809-12.	1997	Huntington, K; Hunter, AGW; Chan, KL	183	8,32
50 MicroRNA-29 in Aortic Dilatation: Implications for Aneurysm Formation Circulation Research 2011;109:115-U66	2011	Boon, Reinier A.; Seeger, Timon; Heydt, Susanne; et al.	178	22,25
51 Abnormal extracellular matrix protein transport associated with increased apoptosis of vascular smooth muscle cells in Marfan syndrome and bicuspid aortic valve thoracic aortic aneurysm Circulation 2003;108:329-33.	2003	Nataatmadja, M; West, M; West, J; et al.	174	10,88
52 Periostin is required for maturation and extracellular matrix stabilization of noncardiomyocyte lineages of the heart Circulation Research 2008;102:752-60.	2008	: Snider, Paige; Hinton, Robert B.; Moreno-Rodriguez, Ricardo A.; et al.	170	15,45
53 Dissection Of The Aorta Associated With Congenital-Malformation Of The Aortic-Valve Journal Of The American College Of Cardiology 1991;17:712-16.	1991	Roberts, Cs; Roberts, Wc	167	5,96
54 Ablation of specific expression domains reveals discrete functions of ectoderm- and endoderm-derived FGF8 during cardiovascular and pharyngeal development Development 2003;130:6361-74.	2003	Macatee, TL; Hammond, BP; Arenkiel, BR; et al.	166	10,38
55 The congenitally bicuspid aortic valve: How does it function? Why does it fail? Annals Of Thoracic Surgery 2004;77:177-84.	2004	Robicsek, F; Thubrikar, MJ; Cook, JW; et al.	162	10,80
56 Bicuspid Aortic Valve Is Associated With Altered Wall Shear Stress in the Ascending Aorta Circulation-Cardiovascular Imaging 2012;5:457-66.	2012	Barker, Alex J.; Markl, Michael; Buerk, Jonas; et al.	160	22,86
57 Epidemiology of valvular heart disease in the adult Nature Reviews Cardiology 2011;8:162-72.	2011	lung, Bernard; Vahanian, Alec	159	19,88
58 Development And Progression Of Aortic-Valve Stenosis - Atherosclerosis Risk-Factors - A Causal Relationship - A Clinical Morphological-Study Clinical Cardiology 1991;14:995-99.	1991	Mohler, Er; Sheridan, Mj; Nichols, R; et al.	160	5,71
59 Long-term results of aortic valve-sparing operations for aortic root aneurysm Journal Of Thoracic And Cardiovascular Surgery 2006;132:347-53.	2006	David, Tirone E.; Feindel, Christopher M.; Webb, Gary D.; et al	157	12,08
60 Failure to prevent progressive dilation of ascending aorta by aortic valve replacement in patients with bicuspid aortic valve: comparison with tricuspid aortic valve Circulation 2003;108:291-94.	2003	Yasuda, H; Nakatani, S; Stugaard, M; et al.	155	9,69
61 Anomalous Coronary-Arteries - Angiographic Findings In 80 Patients International Journal Of Cardiology 1992;34:129-38.	1992	Topaz, O; Demarchena, Ej; Perin, E; Et Al.	155	5,74

TABLE 3. Overall and mean annular citation numbers and the mean of the 100 most cited articles about BAV in the literature (Continued)

Article	Year	Authors	Citation number	Mean Annular citation number
62 Is it reasonable to treat all calcified stenotic aortic valves with a valved stent? Results from a human Anatomic study in adults Journal Of The American College Of Cardiology 2008;51:579-84.	2008	Zegdi, Rachid; Ciobotaru, Vlad; Noghin, Milena; et al	150	13,64
63 Heart Valve Structure and Function in Development and Disease Annual Review Of Physiology 2011;73:29-46. VOL 73	2011	Hinton, Robert B.; Yutzey, Katherine E.	150	18,75
64 Sinus of valsalva aneurysm or fistula: Management and outcome Annals Of Thoracic Surgery 1999;68:1573-77.	1999	Takach, TJ; Reul, GJ; Duncan, JM; et al	152	7,60
65 Prevalence Of Cardiovascular Malformations And Association With Karyotypes In Turners-Syndrome Archives Of Disease In Childhood 1994;71:433-36.	1994	Gotzsche, Co; Kragolsen, B; Nielsen, J; Et Al.	152	6,08
66 Remodeling of chick embryonic ventricular myoarchitecture under experimentally changed loading conditions Anatomical Record 1999;254:238-52.	1999	Sedmera, D; Pexieder, T; Rychterova, V; et al.	151	7,55
67 Task force 4: HCM and other cardiomyopathies, mitral valve prolapse, myocarditis, and Marfan syndrome Journal Of The American College Of Cardiology 2005;45:1340-45.	2005	Maron, BJ; Ackerman, MJ; Nishimura, RA; et al.	146	10,43
68 Natural history of ascending aortic aneurysms in the setting of an unreplaced bicuspid aortic valve Annals Of Thoracic Surgery 2007;83:1338-44.	2007	Davies, Ryan R.; Kaple, Ryan K.; Mandapati, Divakar; et al.	147	12,25
69 Development of heart failure and congenital septal defects in mice lacking endothelial nitric oxide synthase Circulation 2002;106:873-79.	2002	Feng, QP; Song, W; Lu, XR; et al	142	8,35
70 Congenital heart disease in patients with Turner's syndrome Journal Of Pediatrics 1998;133:688-92.	1998	Mazzanti, L; Cacciari, E	137	6,52
71 Predictors of ascending aortic dilatation with bicuspid aortic valve: a wide spectrum of disease expression European Journal Of Cardio-Thoracic Surgery 2007;31:397-04.	2007	Della Corte, Alessandro; Bancone, Ciro; Quarto, Cesare; et al	136	11,33
72 An echocardiographic survey of primary school children for bicuspid aortic valve American Journal Of Cardiology 2004;93:661-63.	2004	Basso, C; Boschello, M; Perrone, C; et al	136	9,07
73 Congenital heart disease in patients with Turner's syndrome Journal Of Pediatrics 1998;133:688-92.	1998	Mazzanti, L; Cacciari, E	137	6,52
74 Novel NOTCH1 mutations in patients with bicuspid aortic valve disease and thoracic aortic aneurysms Journal Of Thoracic And Cardiovascular Surgery 2007;134:290-96.	2007	McKellar, Stephen H.; Tester, David J.; Yagubyan, Marineh; et al.	134	11,17
75 Cardiovascular malformations and complications in Turner syndrome Pediatrics 1998;101:e11	1998	Sybert, VP	133	6,33
76 Notch signaling in cardiac development Circulation Research 2008;102:1169-1181.	2008	Niessen, Kyle; Karsan, Aly	132	12,00
77 KCNJ2 mutation results in Andersen syndrome with sex-specific cardiac and skeletal muscle phenotypes American Journal Of Human Genetics 2002;71:663-68.	2002	Andelfinger, G; Tapper, AR; Welch, RC; et al	132	7,76
78 Aortic Dilation in Bicuspid Aortic Valve Disease Flow Pattern Is a Major Contributor and Differs With Valve Fusion Type Circulation-Cardiovascular Imaging 2013;6:499-07.	2013	Bissell, Malenka M.; Hess, Aaron T.; Biasioli, Luca; et al.	130	21,67
79 Surgical treatment of the dilated ascending aorta: When and how? Annals Of Thoracic Surgery 1998;67:1834-39.	1999	Ergin, MA; Spielvogel, D; Apaydin, A; et al.	129	6,45
80 Aortic-Aneurysm In Patients With Functionally Normal Or Minimally Stenotic Bicuspid Aortic-Valve American Journal Of Cardiology 1991;67:781-82.	1991	Pachulski, Rt; Weinberg, Al; Chan, Kl	128	4,57
81 Aortic valve repair leads to a low incidence of valve-related complications European Journal Of Cardio-Thoracic Surgery 2010;37:127-132.	2010	Aicher, Diana; Fries, Roland; Rodionycheva, Svetlana; et al.	124	13,78
82 Repair-oriented classification of aortic insufficiency: Impact on surgical techniques and clinical outcomes journal Of Thoracic And Cardiovascular Surgery 2009;137:286-94.	2009	Boodhwani, Munir; de Kerchove, Laurent; Glineur, David; et al.	124	12,40
83 22q11.2 distal deletion: A recurrent genomic disorder distinct from DiGeorge syndrome and velocardiofacial syndrome American Journal Of Human Genetics 2008;82:214-21.	2008	Ben-Shachar, Shay; Ou, Zhishuo; Shaw, Chad A.; et al.	124	11,27
84 Evidence for efficacy of the Italian national pre-participation screening programme for identification of hypertrophic cardiomyopathy in competitive athletes European Heart Journal 2006;27:2196-200	2006	Pelliccia, Antonio; Di Paolo, Fernando M.; Corrado, Domenico; et al.	123	9,46

TABLE 3. Overall and mean annular citation numbers and the mean of the 100 most cited articles about BAV in the literature (Continued)

Article	Year	Authors	Citation number	Mean Annular citation number
85 4D Flow CMR in Assessment of Valve-Related Ascending Aortic Disease Jacc-Cardiovascular Imaging 2011;4:781-87	2011	Hope, Michael D.; Hope, Thomas A.; Crook, Stephen E. S.; et al.	120	15,00
86 Valve Configuration Determines Long-Term Results After Repair of the Bicuspid Aortic Valve Circulation 2011;123:178-85.	2011	Aicher, Diana; Kuniyara, Takashi; Abou Issa, Omar; et al.	119	14,88
87 Novel missense mutations (p.T596M and p.P1797H) in NOTCH1 in patients with bicuspid aortic valve Biochemical And Biophysical Research Communications 2006;345:1460-65.	2006	Mohamed, SA; Aherrahrou, Z; Liptau, H; et al	119	9,15
88 Aortopathy Is Prevalent in Relatives of Bicuspid Aortic Valve Patients Journal Of The American College Of Cardiology 2009;53:2288-95.	2009	Biner, Simon; Rafique, Asim M.; Ray, Indraneil; et al.	115	11,50
89 Tricuspid valve repair with an annuloplasty ring results in improved long-term outcomes Circulation 2006;114:1577-81.	2005	Tang, GHL; David, TE; Singh, SK; et al.	115	8,85
90 Morphology of bicuspid aortic valve in children and adolescents Journal Of The American College Of Cardiology 2004;44:1648-51.	2004	Fernandes, SM; Sanders, SP; Khairy, P; et al.	115	7,67
91 Bicuspid aortic valve associated with aortic dilatation - A community-based study Arteriosclerosis Thrombosis And Vascular Biology 2003;23:351-66.	2003	Nkomo, VT; Enriquez-Sarano, M; Ammash, NM; et al.	114	7,13
92 Mechanical properties of dilated human ascending aorta Annals Of Biomedical Engineering 2002;30:624-35.	2002	Okamoto, RJ; Wagenseil, JE; DeLong, WR; et al.	113	6,65
93 Aortic Dilatation in Patients with Bicuspid Aortic Valve New England Journal Of Medicine 2014;370:1920-29.	2014	Verma, Subodh; Siu, Samuel C.	110	22
94 Expression of matrix metalloproteinases and endogenous inhibitors within ascending aortic aneurysms of patients with bicuspid or tricuspid aortic valves Journal Of Thoracic And Cardiovascular Surgery 2007;133:1028-36.	2007	Ikonomidis, John S.; Jones, Jeffery A.; Barbour, John R.; et al.	111	9,25
95 Predictors of aneurysmal formation after surgical correction of aortic coarctation journal Of The American College Of Cardiology 2002;39:617-24.	2002	von Kodolitsch, Y; Aydin, MA; Koschyk, DH; et al.	111	6,53
96 Relationship of aortic cross-sectional area to height ratio and the risk of aortic dissection in patients with bicuspid aortic valves Journal Of Thoracic And Cardiovascular Surgery 2003;126:892-93.	2003	Svensson, LG; Kim, KH; Lytle, BW; et al.	108	6,75
97 Aortic complications after bicuspid aortic valve replacement: Long-term results Annals Of Thoracic Surgery 2002;74:1773-76.	2002	Russo, CF; Mazzetti, S; Garatti, A; et al.	110	6,47
98 Intermediate-term durability of bicuspid aortic valve repair for prolapsing leaflet European Journal Of Cardio-Thoracic Surgery 1999;15:302-08.	1999	Casselmann, FP; Gillinov, AM; Akhrass, R; et al	110	5,50
99 Transcatheter Aortic Valve Implantation in Patients With Bicuspid Aortic Valve Stenosis Jacc-Cardiovascular Interventions 2010;3:1122-25.	2010	Wijesinghe, Namal; Ye, Jian; Rodes-Cabau, Josep; et al	108	12,00
100 Valvuloplasty For Aortic-Insufficiency Journal Of Thoracic And Cardiovascular Surgery 1991;102:571-77. Volume: 102 Issue: 4 Pages: 571-577	1982,00	Cosgrove, Dm; Rosenkranz, Er; Hendren, Wg; Et Al.	107	3,82

Recently, bibliometric studies have been conducted in several fields of medicine worldwide. These studies may be based on both medical and surgical fields consequently. These studies investigating citation indexes and impact factors of previously published articles may also be seen in journals. The most commonly used parameters to evaluate the impact of a study are annual citation numbers. However, more cited articles are identified to be more scientific. These parameters also have limitations. The ISI is a USA-based scientific research association. The main functions of the ISI are to determine the candidate journals for indexing and to control them regularly. Nowadays, the ISI does not index all scientific journals because the journals have to meet the specified criteria. Nonetheless, the ISI serves as a citation and index database search engine, and this service contains published scientific papers since 1945. In addition, it is possible to access some valuable information such as personal,

mean, and annular citation statistics via the WOS search engine (I-10). (ISI= Institute of scientific information. WOS=web of science is an online subscription-based scientific citation indexing service originally produced by the scientific information institute (ISI) in 1964.)

In a study by Ohba et al. (4), including the 100 most cited articles on optics, it was determined that these articles have mostly been published in the Archives of Ophthalmology, Ophthalmology, and American Journal of Ophthalmology. Yoon et al (11) listed the most cited articles regarding radiology between 1945 and 2012; these articles were divided into 4 groups according to neuroradiology, interventional, hepatic cancers, and breast imaging. In another study conducted in 2000, articles regarding anesthesiology have been published in the journals of Sweden, Norway, Finland, and the UK for 2 decades. In this

TABLE 4. The characteristics of the 100 most cited articles about BAV in the literature

	Subgroups	n	Overall citation number mean±SD	Annular Citation Number mean±SD	p value (Overall citation number)	p value (Annular Citation Number)			
Year	1990-1994	7	162,42±43,38	6,01±1,60	0,875	<0,001			
	1995-1999	12	181,83±57,66	8,91±2,84					
	2000-2004	27	265,77±356,51	16,42±21,23					
	2005-2009	32	229,00±151,22	19,71±14,39					
	>2010	22	272,13±210,99	39,55±39,88					
EU or non-EU	Europa	22	203,68±134,59	17,21±14,31	0,154	0,641			
	Non-Europa	78	247,80±247,30	21,98±27,55					
Authors' Nationalities	USA	56	268,98±286,49	25,47±31,73	0,932	0,336			
	Canada	17	195,70±75,95	13,91±5,91					
	Germany	7	210,85±157,18	19,94±14,29					
	Italy	6	155,50±64,46	9,58±2,98					
	Japan	3	182,66±78,47	9,82±5,20					
	Belgium	2	358,50±330,21	39,14±37,67					
	UK	2	250,50±168,99	20,65±1,66					
	Australia	2	195,5±30,40	11,15±0,38					
	France	2	157,5±4,94	17,06±4,33					
	Switzerland	1	198	12,38					
	Austria	1	189	9,45					
	Denmark	1	152	6,08±					
	Type	Guideline	8	514,00±228,36			74,50±52,66	0,001	<0,001
		Review	20	319,70±414,90			24,65±25,49		
		Retrospective	43	198,48±99,49			14,95±8,64		
Meta-analysis		3	174,00±38,15	17,07±13,53					
Prospective		11	145,72±52,19	8,77±3,44					
Case Report		9	177,88±91,23	16,29±7,15					
Experimental		6	173,83±18,01	11,19±5,79					
Surgical or non-Surgical		Surgical	45	180,66±66,01	13,31±6,04	0,080	0,040		
Non-surgical	55	285,09±293,81	27,17±32,43						
Departments	Cardiovascular Surgery	45	180,66±66,01	13,31±6,04	0,201	0,081			
	Cardiology	25	281,00±208,95	31,52±41,13					
	Pediatrics	13	415,84±503,78	31,25±30,05					
	Pathology	5	172,20±31,13	11,23±3,05					
	Radiology	5	158,80±38,41	22,31±4,22					
	Genetics	4	266,75±220,80	23,71±28,14					
	Biology	2	206,0000±56,56	15,44±7,15					
	Engineering	1	115	6,7					
Journals	Circulation	18	265,27±142,36	27,56±27,33	0,124	0,035			
	Journal of the American College of Cardiology	17	373,11±468,95	32,60±48,16					
	Journal of Thoracic and Cardiovascular Surgery	11	185,27±59,59	12,99±4,20					
	Circulation Research	7	185,42±27,96	18,49±7,26					
	Annals of Thoracic Surgery	6	150±29,95	9,34±2,80					
	Heart	3	280,00±92,60	16,84±2,61					
	American Journal of Cardiology	3	129,00±8,54	6,14±2,65					

TABLE 4. The characteristics of the 100 most cited articles about BAV in the literature

Subgroups		n	Overall citation number mean±SD	Annular Citation Number mean±SD	p value (Overall citation number)	p value (Annular Citation Number)
	European Journal of Cardio-Thoracic Surgery	3	124,66±14,50	10,32±4,33		
	European Heart Journal	2	331,50±294,86	29,27±28,02		
	JAMA-Journal of the American Medical Association	2	244,50±4,94	26,45±6,42		
	Development	2	206,00±56,56	15,44±7,15		
	Circulation-Cardiovascular Imaging	2	146,50±21,92	22,48±0,92		
	American Journal of Human Genetics	2	128,00±5,65	9,51±2,48		
	Nature	1	699	49,93		
	Journal of Medical Genetics	1	592	65,78		
	American Heart Journal	1	365	24,33		
	Journal of the American Society of Echocardiography	1	416	46,22		
	Radiology	1	207	23		
	Mayo Clinic Proceedings	1	198	9,90		
	Current Problems in Cardiology	1	188	13,43		
	Journal of Magnetic Resonance Imaging	1	184	26,29		
	Nature Reviews Cardiology	1	161	20,13		
	Clinical Cardiology	1	161	5,75		
	International Journal of Cardiology	1	155	5,74		
	Annual Review of Physiology	1	152	19		
	Archives of Disease in Childhood	1	152	6,08		
	Anatomical Record	1	151	7,55		
	Journal of Pediatrics	1	138	6,57		
	Pediatrics	1	134	6,38		
	Jacc-Cardiovascular Imaging	1	121	15,13		
	Biochemical and Biophysical Research Communications	1	119	9,15		
	Arteriosclerosis Thrombosis and Vascular Biology	1	115	7,19		
	Annals of Biomedical Engineering	1	115	6,76		
	New England Journal of Medicine	1	111	22,20		
	Jacc-Cardiovascular Interventions	1	108	12		
Country of the journal	USA	78	239,28±242,85	21,91±27,29	,024	,036
	UK	12	309,75±196,12	24,31±19,44		
	Netherlands	7	150,71±27,40	8,83±2,90		
	Germany	3	124,66±14,50	10,32±4,33		
Continent of the journal	Europa	78	239,28±242,85	21,91±27,29	0,881	0,251
	Non-Europa	22	233,90±166,37	17,48±16,15		
Study Interest	Clinical	40	171,50±59,60	12,40±6,00	0,008	<0,001
	Incidence	11	407,72±557,34	27,76±32,33		
	Genetics	15	227,00±131,89	19,97±16,47		
	Pathology	15	177,26±47,46	11,23±2,94		
	Guideline	8	514,00±228,36	74,50±52,66		
	Imaging	5	158,80±38,41	22,31±4,22		
	Classification	3	250,33±56,61	18,16±4,73		
	Pathophysiology	2	296,00±140,00	21,47±2,50		

study, journals from Finland and Norway had significantly increased citation numbers within years. Furthermore, the percentage of the citation number also increased in journals from all these countries.

Bibliographic evaluation-based studies have become widespread in the cardiovascular field. Kolkailah et al. (23) presented a bibliographic study on behalf of the 50th anniversary of heart transplantation. In this study, there was no correlation between the journal citation index and the yearly issue number. Usman et al. (24) assessed the 100 most cited articles related to valvular diseases and remarked that the number of interventional studies had increased recently. Compatible with this, we observed that studies on interventional valve placement and valve repair techniques have constantly increased in terms of number and citation. We interpreted these findings as a result of the popularity of the newly emerging interventional and valve sparing methods. On the other hand, Lai et al. (25) presented bibliographic research on aortic dissection and presented a historical development of surgical techniques. Liao et al. (26) evaluated the 100 most cited articles related to coronary artery diseases and remarked on the development in treatment options. Shuaib et al. (27) observed a decrease in the non-invasive cardiology field when compared with similar studies on cardiovascular diseases. They explained that these results were a consequence of improved bridging with revascularization methods, and the guidelines supported this. Considering our findings regarding the increased citation number of the studies about intervention methods, we concluded a similar comment, and we attributed this to a collaboration of clinicians as a heart team. Pennel et al. (28) observed an increase in citation number in the last 5 years when they evaluated the 100 most frequently cited articles related to cardiovascular magnetic resonance imaging (MRI). They attributed this finding to the increased patient population with cardiovascular diseases and the use of MRI. Oh et al. (29) conducted a bibliographical study on hypertension, and they detected an increased citation number in correlation with developing technologies and highlighted this acceleration.

Study Limitations

This study has several limitations. First, the most cited articles were determined via WOS and PubMed. Moreover, it is known that citation numbers may vary among different databases. Although these studies have evaluated overall and annular citation numbers, the list had not been formed in this manner. Second, although the overall citation number and annular citation rates have received broad acceptance in terms of evaluation of a scientific paper, a value of an article cannot be assessed only by the aforementioned parameters.

To the best of our knowledge, no study has evaluated BAV and the citation numbers of articles related to this subject in the literature. This study includes detailed information about the 100 most cited articles on BAV and presents their assessment. Consequently, we believe that the citation numbers of studies on innovative materials (e.g., sutureless, bioprosthesis valves, etc.) for aortic valve will constantly increase in the following years. Bibliographic articles using scientific search engines may contribute to determining the subjects that should be focused on in cardiovascular surgery. Furthermore, such studies should be updated regularly for reliable data analysis.

Ethics Committee Approval: Ethics committee approval was received for this study from the 9 Eylül University Faculty (number: 377-GOA 2018/03-09).

Informed Consent: N/A

Peer-review: Externally peer-reviewed.

Author contributions: Concept - S.B., V.H., T.G.; Design - S.B., V.H., S.B., Ç.B.; Supervision - V.H., S.B., G.A.; Resource - S.B., V.H., S.B., T.G., G.A.; Materials - S.B., G.A., S.B.; Data Collection and/or Processing - S.B.; Analysis and/or Interpretation - S.B., Ç.B., G.A., V.H., T.G.; Literature Search - S.B.; Writing - S.B., T.G., V.H.; Critical Reviews - S.B., V.H., S.B.

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