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Original Article / Özgün Araştırma

Bibliometric Analysis of Top 100 Most Cited Articles Related To “Liver Transplantation” in Anesthesia Literature

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Abstract

Objective: For treatment of acute liver failure, end-stage liver diseases and liver-sourced malignant tumors, liver transplantation is a treatment method applied as a last resource. In our study, the aim was to assess 100 articles with most citations about liver transplantation in the anesthesia literature.

Methods: Our study used the “advanced mode” feature of the “Institute for Scientific Information (ISI) Web of Science (WOS)” search engine. The search was performed on 11.12.2018 and 100 articles with most citations related to liver transplantation were determined. For each article, total citation number, annual citation number, authors, and catalogue information for the study and journal were determined using Web of Science (WOS) and PubMed.

Results: The total mean number of citations for 103 studies with most citations was determined as 75.87 ± 68.48 . The annual citation numbers for the studies varied from 34.18 to 1.15, with mean of 4.98 ± 4.60 . When the areas of focus of the studies are investigated, the first three areas were transfusion practice in 17 articles (16.5%), thromboelastography in 14 (13.6%) and hemodynamic monitoring in 10 (9.7%). The mean number of citations of authors from the European continent was significantly higher than authors from other continents ($p < 0.01$).

Conclusion: Our study is the first to evaluate and analyze the top 103 articles receiving most citations related to liver transplantation in the anesthesia literature. Bibliographic studies created using scientific search engines are illustrative of the topics of focus for authors and researchers.

Keywords: liver transplantation; citations; bibliometric analysis; web of science

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Anestezi Literatüründe “Karaciğer Transplantasyonu” İle İlgili En Çok Atıf Alan 100 Makalenin Değerlendirilmesi

Öz

Amaç: Akut karaciğer yetmezliği, son dönem karaciğer hastalıkları ve karaciğer kaynaklı malign tümörlerin tedavisinde karaciğer transplantasyonu son çare olarak uygulanan tedavi yöntemidir. Çalışmamızda anestezi literatüründe karaciğer transplantasyonu ile ilgili olan ve en çok atıf alan 100 yayının değerlendirilmesi amaçlanmıştır.

Yöntemler: Çalışmamız “Institute for Scientific Information (ISI) Web of Science (WOS)” arama motorunun “advanced mode” özelliği kullanılarak yapıldı. Arama 11.12.2018 tarihinde yapıldı ve arama sonuçlarından karaciğer transplantasyonu ile ilgili en çok atıf alan 100 yayın belirlendi. Her yayının toplam atıf sayısı, yıllık atıf sayısı, çalışmacıları, çalışmanın ve derginin katalog bilgileri Web of Science (WOS) ve PubMed kullanılarak belirlendi.

Bulgular: En fazla atıf alan 103 çalışmanın toplam atıf sayısının ortalaması $75,87 \pm 68,48$ olarak belirlendi. Çalışmaların yıllık atıf sayıları 34,18 ile 1,15 arasında değişmekte olup, ortalama $4,98 \pm 4,60$ olarak bulundu. Çalışmaların odaklandığı alanlar incelendiğinde ilk üç alanı sırasıyla; transfüzyon pratiği 17 (%16,5), tromboelastografi 14 (%13,6) ve hemodinamik monitörizasyon 10 (%9,7) gelmekteydi. Avrupa kıtasındaki yazarların atıf sayısı ortalaması Avrupa kıtası dışındaki yazarlardan anlamlı olarak yüksekti ($p < 0.01$). Derginin kıtası ve derginin indeksi ile toplam ve yıllık atıf sayısı arasında anlamlı bir ilişki belirlenemedi.

Sonuç: Çalışmamız anestezi literatürde karaciğer transplantasyonu ile ilgili en çok atıf alan ilk 103 çalışmanın değerlendirilip analiz edildiği ilk çalışmadır. Bilimsel arama motorlarını kullanılarak oluşturulan bibliyografik yazılar, araştırmacılara hangi konulara ağırlık verilmesi konusunda yol göstericidir.

Anahtar kelimeler: karaciğer transplantasyonu; atıf; bibliyometrik analiz, web of science.

INTRODUCTION

The importance of organ transplantation in modern treatment is increasing. Liver transplantation is a treatment method used as a last resource for acute liver failure, end-stage liver diseases and malignant tumors sourced in the liver¹. Liver transplants from living donors were performed for the first time in Brazil in 1988, but was unsuccessful². After this failure, studies continued rapidly and the first successful liver transplantation was completed in 1990 by Strong et al. in Australia³.

Bibliometry is a serial method used to evaluate scientific publications about a certain topic. Bibliometric studies are beneficial to assess the social and scientific importance of a certain scientific field during a certain period⁴. When a scientific article references another scientific article, this is defined as citing that article. Larger numbers of citations received by a

scientific article show the power of effect of that article⁵.

According to our research, there is no study investigating citation numbers for international articles about liver transplantation in the anesthesia literature from recent years. This study aims to examine the most cited international articles related to liver transplantation in the anesthesia literature using the Institute for Scientific Information's (ISI) Web of Science (WOS) search engine⁶ and to investigate these articles in terms of journal of publication, organizations, countries and authors.

METHODS

This study used the “advanced mode” feature of the “Institute for Scientific Information (ISI) Web of Science (WOS)” search engine. The search words “SU=anesth* AND TI=transplant* OR SU=anesth* AND TS=transplant* OR

WC=anesth* AND TI=transplant* OR
 WC=anesth* AND TS=transplant* OR
 SU=transplant* AND TI=anesth* OR
 SU=transplant* AND TS=anesth* OR WC=
 transplant* AND TI=anesth* OR WC=
 transplant* AND TS=anesth*” were used. The
 search was performed on 11.12.2018 and 100
 articles with most citations related to liver
 transplantation were determined. For each
 article, total citation number, annual citation
 numbers, authors, and catalogue information
 for the study and journal were determined
 using Web of Science (WOS) and PubMed.

Our study included articles from 1975 to
 December 2018. One-hundred and three
 publications with most citations were
 determined from international articles
 published related to the topic. Since the last four
 articles had the same citations, a total of 103
 articles were analyzed. The list was screened
 one-by-one to check whether the first authors
 were listed in any other articles. For each
 article, total citation number, annual citation
 numbers, authors, and catalogue information
 for the study and journal were determined
 using Web of Science (WOS) and PubMed.

Hitit University Faculty of Medicine Clinical
 Research Ethics by the presidency of the board
 due to the design of the study board approval
 was not required.

Statistical Analysis

Data obtained in the research were entered into
 the SPSS (Statistical Package For Social Sciences,
 Chicago, IL, USA) 15.0 program for statistical
 analysis. The Kruskal Wallis test and Mann
 Whitney U test were used to compare groups. A
 p value of less than 0.05 was accepted as
 significantly different.

RESULTS

Literature analysis from 1975 to December
 2018 with the Web of Science using the
 designated key words determined a total of
 6358 articles. The citation numbers and means
 for 103 articles with most citations in the field
 of liver transplantation in the anesthesia
 literature are given in Table 1. The study with
 most citations was cited 456 times, while the
 lowest citation number was 36. The mean total
 citation number for the 103 articles with most
 citations was determined as 75.87 ± 68.48 . The
 annual citation numbers for the studies varied
 from 34.18 to 1.15, with mean of 4.98 ± 4.60 .

The distribution of first author names in the
 studies is given in Table 2. The article with most
 citations was by Kang Yg, Martin Dj, Marquez J,
 et al. published in “Anesthesia and Analgesia”
 journal in 1985 with the title “Intraoperative
 Changes in Blood-Coagulation and
 Thrombelastographic Monitoring in Liver
 Transplantation”.

The distribution of first author affiliation for the
 103 articles with most citations is presented in
 Table 3.

When the areas of focus of the 103 studies with
 most citations related to liver transplantation in
 the anesthesia literature are investigated, the
 first three areas were transfusion practice in 17
 articles (16.5%), thromboelastography in 14
 (13.6%) and hemodynamic monitoring in 10
 (9.7%). The first four journals for the 103
 articles with most citations were determined to
 be Anesthesia and Analgesia, British Journal of
 Anaesthesia, Liver Transplantation, and
 Anesthesiology. Of the 103 articles with most
 citations, 92.2% were in SCI index journals and
 7.8% were in SCI-E index journals. When the
 distribution of author’s countries are
 investigated, the first 3 countries were the
 United States of America (USA), France and
 England. Of studies, 42.7% were from countries
 in Europe and 57.3% were from countries

outside of Europe. There was no correlation determined between the author's continent and total number of citations. There was a significant correlation between the author's continent and mean annual citation numbers. The mean number of citations of authors from the European continent was significantly higher

than authors from other continents. There was no significant correlation between the total and annual citations between journal continent and journal index. The distribution according to features of the 103 studies with most citations in the liver transplantation field in the anesthesia literature is presented in Table 4.

Table I. 103 studies with most citations related to liver transplantation in the anesthesia literature and citation rates

Rank	Title	Year	Authors	Citations	Mean
1	Intraoperative Changes in Blood-Coagulation And Thrombelastographic Monitoring in Liver-Transplantation	1985	Kang, Yg; Martin, Dj; Marquez, J; Lewis, Jh; Bontempo, Fa; Shaw, Bw; Starzl, Te; Winter, Pm	456	13,41
2	Thrombelastography	1992	Mallett, Sv; Cox, Dja	407	15,07
3	Coagulation Monitoring: Current Techniques And Clinical Use of Viscoelastic Point-Of-Care Coagulation Devices	2008	Ganter, Michael T.; Hofer, Christoph K.	376	34,18
4	Early Enteral Supply of Lactobacillus And Fiber Versus Selective Bowel Decontamination: A Controlled Trial In Liver Transplant Recipients	2002	Rayes, N; Seehofer, D; Hansen, S; Boucsein, K; Muller, Ar; Serke, S; Bengmark, S; Neuhaus, P	279	16,41
5	The Impact of Intraoperative Transfusion Of Platelets And Red Blood Cells On Survival After Liver Transplantation	2008	De Boer, Marieke T.; Christensen, Michael C.; Asmussen, Mikael; Van Der Hilst, Christian S.; Hendriks, Herman G. D.; Slooff, Maarten J. H.; Porte, Robert J.	165	15
6	Epsilon-Aminocaproic Acid For Treatment Of Fibrinolysis During Liver-Transplantation	1987	Kang, Y; Lewis, Jh; Navalgund, A; Russell, Mw; Bontempo, Fa; Niren, Ls; Starzl, Te	158	4,94
7	Transfusion Triggers In Orthotopic Liver Transplantation: A Comparison of The Thromboelastometry Analyzer, The Thromboelastogram, And Conventional Coagulation Tests	2006	Coakley, Margaret; Reddy, Kalpana; Mackie, Ian; Mallett, Susan	141	10,85
8	Effect of Low Central Venous Pressure And Phlebotomy on Blood Product Transfusion Requirements During Liver Transplantations	2006	Massicotte, L; Lenis, S; Thibeault, L; Sassine, Mp; Seal, Rf; Roy, A	140	10,77
9	Leukocyte Adhesion And Cell-Death Following Orthotopic Liver-Transplantation in The Rat	1991	Takei, Y; Marzi, I; Gao, Ws; Gores, Gj; Lemasters, Jj; Thurman, Rg	136	4,86
10	Tranexamic Acid Reduces Blood Loss, Transfusion Requirements, And Coagulation Factor Use in Primary Orthotopic Liver Transplantation	1996	Boylan, Jf; Klinck, Jr; Sandler, An; Arellano, R; Greig, Pd; Nierenberg, H; Roger, Sl; Glynn, Mfx	126	5,48
11	Evaluation of An Uncalibrated Arterial Pulse Contour Cardiac Output Monitoring System in Cirrhotic Patients Undergoing Liver Surgery	2009	Biancofiore, G.; Critchley, L. A. H.; Lee, A.; Bindi, L.; Bisa, M.; Esposito, M.; Meacci, L.; Mozzo, R.; Desimone, P.; Urbani, L.; Filipponi, F.	116	11,6
12	Anesthesia For Hepatic Transplantation - Cardiovascular and Metabolic Alterations and Their Management	1985	Carmichael, Fj; Lindop, Mj; Farman, Jv	116	3,41
13	Uncalibrated Pulse Contour-Derived Stroke Volume Variation Predicts Fluid Responsiveness in Mechanically Ventilated Patients Undergoing Liver Transplantation	2008	Biais, M.; Nouette-Gaulain, K.; Cottenceau, V.; Revel, P.; Sztark, F.	111	10,09
14	Tranexamic Acid Reduces Red Cell Transfusion Better Than Epsilon-Aminocaproic Acid or Placebo in Liver Transplantation	2000	Dalmau, A; Sabate, A; Acosta, F; Garcia-Huete, L; Koo, M; Sansano, T; Rafecas, A; Figueras, J; Jaurrieta, E; Parrilla, P	102	5,37

15	Rotation Thromboelastometry Detects Thrombocytopenia and Hypofibrinogenaemia During Orthotopic Liver Transplantation	2010	Roullet, S.; Pillot, J.; Freyburger, G.; Biais, M.; Quinart, A.; Rault, A.; Revel, P.; Sztark, F.	95	10,56
16	Intraoperative Blood Losses and Transfusion Requirements During Adult Liver Transplantation Remain Difficult to Predict	2001	Steib, A; Freys, G; Lehmann, C; Meyer, C; Mahoudeau, G	95	5,28
17	Platelet Transfusion During Liver Transplantation is Associated With Increased Postoperative Mortality Due To Acute Lung Injury	2009	Pereboom, Ilona T. A.; De Boer, Marieke T.; Haagsma, Elizabeth B.; Hendriks, Herman G. D.; Lisman, Ton; Porte, Robert J.	92	9,2
18	A Case Of Successful Enteroscopic Balloon Dilation For Late Anastomotic Stricture Of Choledochojejunostomy After Living Donor Liver Transplantation	2005	Haruta, H; Yamamoto, H; Mizuta, K; Kita, Y; Uno, T; Egami, S; Hishikawa, S; Sugano, K; Kawarasaki, H	90	6,43
19	Survival Rate Changes With Transfusion of Blood Products During Liver Transplantation	2005	Massicotte, L; Sassine, Mp; Lenis, S; Seal, Rf; Roy, A	88	6,29
20	Right Heart Dysfunction, Pulmonary-Embolism, And Paradoxical Embolization During Liver-Transplantation - A Trans-Esophageal Two-Dimensional Echocardiographic Study	1989	Ellis, Je; Lichtor, JI; Feinstein, Sb; Chung, Mr; Polk, SI; Broelsch, C; Emond, J; Thistlethwaite, Jr; Roizen, Mf	87	2,9
21	Intraoperative Fluid Management During Orthotopic Liver Transplantation	2004	Schroeder, Ra; Collins, Bh; Tuttle-Newhall, E; Robertson, K; Plotkin, J; Johnson, Lb; Kuo, Pc	86	5,73
22	Acute Kidney Injury During Liver Transplantation As Determined By Neutrophil Gelatinase-Associated Lipocalin	2009	Niemann, Claus U.; Walia, Ann; Waldman, Jeffrey; Davio, Michael; Roberts, John P.; Hirose, Ryutaro; Feiner, John	85	8,5
23	Extrahepatic Metabolism of Propofol In Man During The Anhepatic Phase of Orthotopic Liver-Transplantation	1992	Veroli, P; Okelly, B; Bertrand, F; Trouvin, Jh; Farinotti, R; Ecoffey, C	85	3,15
24	Transfusion Predictors in Liver Transplant	2004	Massicotte, L; Sassine, Mp; Lenis, S; Roy, A	84	5,6
25	Portopulmonary Hypertension and The Liver Transplant Candidate	1999	Kuo, Pc; Plotkin, Js; Gaine, S; Schroeder, Ra; Rustgi, Vk; Rubin, Lj; Johnson, Lb	84	4,2
26	Institutional Variability in Transfusion Practice For Liver Transplantation	2003	Ozier, Y; Pessione, F; Samain, E; Courtois, F	83	5,19
27	Coagulation Defects Do Not Predict Blood Product Requirements During Liver Transplantation	2008	Massicotte, Luc; Beaulieu, Danielle; Thibeault, Lynda; Roy, Jean-Denis; Marleau, Denis; Lapointe, Real; Roy, Andre	82	7,45
28	History of Pediatric Liver Transplantation. Where Are We Coming From? Where Do We Stand?	2002	Otte, JB	82	4,82
29	Cardiovascular Depression Secondary to Ionic Hypocalcemia During Hepatic Transplantation in Humans	1986	Marquez, J; Martin, D; Virji, Ma; Kang, Yg; Warty, Vs; Shaw, B; Sassano, Jj; Waterman, P; Winter, Pm; Pinsky, Mr	81	2,45
30	Organ Transplantation: Historical Perspective and Current Practice	2012	Watson, C. J. E.; Dark, J. H.	75	10,71
31	Use of Heparinase Modified Thrombelastography in Liver Transplantation	1997	Harding, Sa; Mallett, Sv; Peachey, Td; Cox, Dj	71	3,23
32	Moderate Primary Pulmonary Hypertension in Patients Undergoing Liver Transplantation	1996	Taura, P; Garciavaldecasas, Jc; Beltran, J; Izquierdo, E; Navasa, M; Salablanck, J; Mas, A; Balust, J; Grande, L; Visa, J	69	3
33	Fast Interpretation of Thromboelastometry in Non-Cardiac Surgery: Reliability in Patients With Hypo-, Normo-, And Hypercoagulability	2013	Goerlinger, K.; Dirkmann, D.; Solomon, C.; Hanke, A. A.	68	11,33
34	Air-Embolism Associated With Venovenous Bypass During Orthotopic Liver-Transplantation	1987	Khoury, Gf; Mann, Me; Porot, Mj; Abdulrasool, Ih; Busuttill, Rw	68	2,13
35	Quantitative Measurement of Thromboelastography As A Function of Platelet Count	1999	Oshita, K; Az-Ma, T; Osawa, Y; Yuge, O	65	3,25
36	Perioperative Care Of The Liver-Transplant Patient. Part 2.	1994	Carton, Eg; Plevak, Dj; Kranner, Pw; Rettke, Sr; Geiger, Hj; Coursin, Db	65	2,6
37	Right Ventricular-Function During Orthotopic Liver-Transplantation	1993	Dewolf, Am; Begliomini, B; Gasior, Ta; Kang, Y; Pinsky, Mr	65	2,5

38	Acute Kidney Injury Following Orthotopic Liver Transplantation: Incidence, Risk Factors, and Effects on Patient and Graft Outcomes	2015	Hilmi, I. A.; Damian, D.; Al-Khafaji, A.; Planinsic, R.; Boucek, C.; Sakai, T.; Chang, C. - C. H.; Kellum, J. A.	62	15,5
39	Cardiac Output Measurement in Patients Undergoing Liver Transplantation: Pulmonary Artery Catheter Versus Uncalibrated Arterial Pressure Waveform Analysis	2008	Matthieu, Biais; Karine, Nouette-Gaulain; Vincent, Cottenceau; Alain, Vallet; Francois, Cochard Jean; Philippe, Revel; Francois, Sztark	60	5,45
40	Effect of Intraoperative Low-Dose Dopamine on Renal-Function In Liver-Transplant Recipients	1991	Swygert, Th; Roberts, Lc; Valek, Tr; Brajtbord, D; Brown, Mr; Gunning, Tc; Paulsen, Aw; Ramsay, Mae	59	2,11
41	Transfusion Rate For 500 Consecutive Liver Transplantations: Experience Of One Liver Transplantation Center	2012	Massicotte, Luc; Denault, Andre Y.; Beaulieu, Danielle; Thibeault, Lynda; Hevesi, Zoltan; Nozza, Anna; Lapointe, Real; Roy, Andre	57	8,14
42	Evaluation of A New Software Version of The Flotrac/Vigileo (Version 3.02) and A Comparison With Previous Data in Cirrhotic Patients Undergoing Liver Transplant Surgery	2011	Biancofiore, Gianni; Critchley, Lester A. H.; Lee, Anna; Yang, Xiao-Xing; Bindi, Lucia M.; Esposito, Massimo; Bisa, Massimo; Meacci, Luca; Mozzo, Roberto; Filippini, Franco	57	7,13
43	Pharmacokinetics and Pharmacodynamics of Cisatracurium in Patients With End-Stage Liver Disease Undergoing Liver Transplantation	1996	Dewolf, Am; Freeman, Ja; Scott, Vl; Tullock, W; Smith, Da; Kisor, Df; Kerls, S; Cook, Dr	56	2,43
44	Pulmonary-Hypertension and Liver-Transplantation	1993	Dewolf, Am; Scott, Vl; Gasior, T; Kang, Yg	56	2,15
45	Massive Pulmonary Thromboembolism During Liver-Transplantation	1988	Navalgund, Aa; Kang, Yg; Sarnier, Jb; Jahr, Js; Gieraerts, R	56	1,81
46	Poor Prediction of Blood Transfusion Requirements in Adult Liver Transplantations From Preoperative Variables	2000	Findlay, Jy; Rettke, Sr	55	2,89
47	Intraoperative Transesophageal Echocardiography During Liver Transplantation	1996	Suriani, Rj; Cutrone, A; Feierman, D; Konstadt, S	55	2,39
48	Continuous Small-Dose Aprotinin Controls Fibrinolysis During Orthotopic Liver Transplantation	1996	Marcel, Rj; Stegall, Wc; Suit, Ct; Arnold, Jc; Vera, Rl; Ramsay, Mae; Odonnell, Mb; Swygert, Th; Hein, Hat; Whitten, Cw	55	2,39
49	Pulmonary-Hypertension Associated With Liver-Disease is not Reversible After Liver-Transplantation	1992	Prager, Mc; Cauldwell, Ca; Ascher, Nl; Roberts, Jp; Wolfe, Cl	55	2,04
50	Increased Prothrombin Time and Platelet Counts in Living Donor Right Hepatectomy: Implications For Epidural Anesthesia	2004	Siniscalchi, A; Begliomini, B; De Pietri, L; Braglia, V; Gazzi, M; Masetti, M; Di Benedetto, F; Pinna, Ad; Miller, Cm; Pasetto, A	54	3,6
51	The Effect of Methylene Blue on The Hemodynamic Changes During Ischemia Reperfusion Injury in Orthotopic Liver Transplantation	2002	Koelzow, H; Gedney, Ja; Baumann, J; Snook, Nj; Bellamy, Mc	54	3,18
52	Monitoring Patients at Risk of Massive Transfusion With Thrombelastography or Thromboelastometry: A Systematic Review	2011	Wikkelsoe, A. J.; Afshari, A.; Wetterslev, J.; Brok, J.; Moeller, A. M.	53	6,63
53	Predictors of Blood Product Use in Orthotopic Liver Transplantation Using The Piggyback Hepatectomy Technique	2007	Mangus, R. S.; Kinsella, S. B.; Nobari, M. M.; Fridell, J. A.; Vianna, R. M.; Ward, E. S.; Nobari, R.; Tector, A. J.	53	4,42
54	Outcome of Liver Transplantation For Patients with Pulmonary Hypertension	2002	Starkel, P; Vera, A; Gunson, B; Mutimer, D	53	3,12
55	Pulmonary-Artery Hypertension Complicating Anesthesia For Liver-Transplantation	1992	Cheng, Ey; Woehlck, Hj	53	1,96
56	Considerations For Anesthetic Management During Venovenous Bypass in Adult Hepatic Transplantation	1989	Paulsen, Aw; Whitten, Cw; Ramsay, Mae; Klintmalm, Gb	53	1,77
57	Anesthetic Management of Hepatic Transplantation	2008	Ozier, Yves; Klinck, John R.	52	4,73
58	Intraoperative Resource Utilization in Anesthesia For Liver Transplantation in The United States: A Survey	2003	Schumann, R	52	3,25

59	Endogenous Heparin-Like Substances Significantly Impair Coagulation in Patients Undergoing Orthotopic Liver Transplantation	1998	Kettner, Sc; Gonano, C; Seebach, F; Sitzwohl, C; Acimovic, S; Stark, J; Schellongowski, A; Blaicher, A; Felfernig, M; Zimpher, M	52	2,48
60	Continuous Small-Dose Tranexamic Acid Reduces Fibrinolysis But Not Transfusion Requirements During Orthotopic Liver Transplantation	1997	Kaspar, M; Ramsay, Mae; Nguyen, At; Cogswell, M; Hurst, G; Ramsay, Kj	52	2,36
61	Liver Transplantation in The Morbidly Obese	1996	Braunfeld, My; Chan, S; Pregler, J; Neelakanta, G; Sopher, Mj; Busuttil, Rw; Csete, M	52	2,26
62	Arginase Release Following Liver Reperfusion - Evidence of Hemodynamic Action of Arginase Infusions	1995	Langle, F; Roth, E; Steininger, R; Winkler, S; Muhlbacher, F	52	2,17
63	Association of Intraoperative Hypotension and Pulmonary Hypertension With Adverse Outcomes After Orthotopic Liver Transplantation	2003	Reich, Dl; Wood, Rk; Emre, S; Bodian, Ca; Hossain, S; Krol, M; Feerman, D	51	3,19
64	Postoperative Tracheal Extubation After Orthotopic Liver Transplantation	2001	Glanemann, M; Langrehr, J; Kaisers, U; Schenk, R; Muller, A; Stange, B; Neumann, U; Bechstein, Wo; Falke, K; Neuhaus, P	51	2,83
65	Immediate Tracheal Extubation After Liver Transplantation: Experience of Two Transplant Centers	1997	Mandell, Ms; Lockrem, J; Kelley, Sd	51	2,32
66	Extended Donor Criteria Have No Negative Impact on Early Outcome After Liver Transplantation: A Single-Center Multivariate Analysis	2007	Schemmer, P.; Nickkholgh, A.; Hinz, U.; Gerling, T.; Mehrabi, A.; Sauer, P.; Encke, J.; Friess, H.; Weitz, J.; Buechler, M. W.; Schmidt, J.	50	4,17
67	Altered Hematologic Profiles Following Donor Right Hepatectomy and Implications For Perioperative Analgesic Management	2004	Schumann, R; Zabala, L; Angelis, M; Bonney, I; Tighiouart, H; Carr, Db	50	3,33
68	Systematic Grading of Surgical Complications in Live Liver Donors According to Clavien's System	2006	Tamura, Sumihito; Sugawara, Yasuhiko; Kaneko, Junichi; Yamashiki, Noriyo; Kishi, Yoji; Matsui, Yuichi; Kokudo, Norihiro; Makuuchi, Masatoshi	49	3,77
69	Comparison of Invasive and Noninvasive Measurement of Plasma Disappearance Rate of Indocyanine Green in Patients Undergoing Liver Transplantation: A Prospective Investigator-Blinded Study	2004	Faybik, P; Krenn, Cg; Baker, A; Lahner, D; Berlakovich, G; Steltzer, H; Hetz, H	49	3,27
70	Preload And Haemodynamic Assessment During Liver Transplantation: A Comparison Between The Pulmonary Artery Catheter and Transpulmonary Indicator Dilution Techniques	2002	Della Rocca, G; Costa, Mg; Coccia, C; Pompei, L; Pietropaoli, P	49	2,88
71	Extrahepatic Morphine-Metabolism in Man During The Anhepatic Phase of Orthotopic Liver-Transplantation	1989	Bodenham, A; Quinn, K; Park, Gr	49	1,63
72	Predictors of Hyperkalemia in The Prereperfusion, Early Postreperfusion, and Late Postreperfusion Periods During Adult Liver Transplantation	2007	Xia, Victor W.; Ghobrial, Rafik M.; Du, Bin; Chen, Tabitha; Hu, Ke-Qin; Hiatt, Jonathan R.; Busuttil, Ronald W.; Steadman, Randolph H.	47	3,92
73	Fibrinolysis During Liver Transplantation is Enhanced By Using Solvent/Detergent Virus-Inactivated Plasma (Esdep (R))	2002	De Jonge, J; Groenland, Thn; Metselaar, Hj; Ijzermans, Jnm; Van Vliet, Hhdm; Visser, L; Tilanus, Hw	47	2,76
74	Does Adult Liver-Transplantation Without Venovenous Bypass Result in Renal-Failure	1992	Veroli, P; Elhage, C; Ecoffey, C	47	1,74
75	Pulmonary Thromboembolism During Adult Liver Transplantation: Incidence, Clinical Presentation, Outcome, Risk Factors, and Diagnostic Predictors	2012	Sakai, T.; Matsusaki, T.; Dai, F.; Tanaka, K. A.; Donaldson, J. B.; Hilmi, I. A.; Marsh, J. Wallis; Planinsic, R. M.; Humar, A.	46	6,57
76	Monitoring of Haemostasis in Liver Transplantation: Comparison of Laboratory Based and Point of Care Tests	2010	Herbstreit, F.; Winter, E. M.; Peters, J.; Hartmann, M.	46	5,11
77	Patterns of Coagulopathy During Liver-Transplantation - Experience With The First 75 Cases Using Thrombelastography	1994	Mcnicol, Pl; Liu, G; Harley, Id; Mccall, Pr; Przybylowski, Gm; Bowkett, J; Angus, Pw; Hardy, Kj; Jones, Rm	46	1,84

78	Epidural Catheter and Increased Prothrombin Time After Right Lobe Hepatectomy For Living Donor Transplantation	2000	Borrromeo, Cj; Stix, Ms; Lally, A; Pomfret, Ea	45	2,37
79	Temperature Corrected Thrombelastography in Hypothermic Patients	1995	Douning, Lk; Ramsay, Mae; Swygert, Th; Hicks, Kn; Hein, Hat; Gunning, Tc; Suit, Ct	45	1,88
80	Three Patients Requiring Both Coronary-Artery Bypass-Surgery and Orthotopic Liver-Transplantation	1995	Morris, Jj; Hellman, Cl; Gawey, Bj; Ramsay, Mae; Valek, Tr; Gunning, Tc; Swygert, Th; Shorelesserson, L; Lalehzarian, F; Brayman, Kl; Brennan, Ta	45	1,88
81	Anesthesia For Pediatric Orthotopic Liver-Transplantation	1985	Borland, Lm; Roule, M; Cook, Dr	45	1,32
82	Meld Score And Blood Product Requirements During Liver Transplantation: No Link	2009	Massicotte, Luc; Beaulieu, Danielle; Roy, Jean-Denis; Marleau, Denis; Vandenbroucke, Frank; Dagenais, Michel; Lapointe, Real; Roy, Andre	43	4,3
83	Fatal Pulmonary Embolism During Liver Transplantation	1997	Sopher, M; Braunfeld, M; Shackleton, C; Busuttill, Rw; Sangwan, S; Csete, M	43	1,95
84	Continuous Versus Intermittent Thermodilution Cardiac Output Measurement During Orthotopic Liver Transplantation	1997	Bottiger, Bw; Sinner, B; Motsch, J; Bach, A; Bauer, H; Martin, E	43	1,95
85	Amelioration of Lactic-Acidosis With Dichloroacetate During Liver-Transplantation in Humans	1994	Shangraw, Re; Winter, R; Hromco, J; Robinson, St; Gallaher, Ej	43	1,72
86	Systematic Review And Meta-Analysis of The Impact of Computed Tomography-Assessed Skeletal Muscle Mass on Outcome in Patients Awaiting or Undergoing Liver Transplantation	2016	Van Vugt, J. L. A.; Levolger, S.; De Bruin, R. W. F.; Van Rosmalen, J.; Metselaar, H. J.; Ijzermans, J. N. M.	42	14
87	A Comparison of Stroke Volume Variation Measured By Vigileo (Tm)/Flotrac (Tm) System and Aortic Doppler Echocardiography	2009	Biais, Matthieu; Nouette-Gaulain, Karine; Rouillet, Stephanie; Quinart, Alice; Revel, Philippe; Sztark, Francois	41	4,1
88	Four Cases of Cardiopulmonary Thromboembolism During Liver Transplantation Without The Use of Antifibrinolytic Drugs	2005	Lerner, Ab; Sundar, E; Mahmood, F; Sarge, T; Hanto, Dw; Panzica, Pj	41	2,93
89	Fast Track in Liver Transplantation: 5 Years' Experience	2005	Biancofiore, G; Bindi, Ml; Romanelli, Am; Boldrini, A; Bisa, M; Esposito, M; Urbani, L; Catalano, G; Mosca, F; Filippini, E	41	2,93
90	Transesophageal Echocardiography Utilization in High-Volume Liver Transplantation Centers in The United States	2008	Wax, David B.; Torres, Antonio; Scher, Corey; Leibowitz, Andrew B.	40	3,64
91	Regional Cerebral Oxygen Saturation is A Sensitive Marker of Cerebral Hypoperfusion During Orthotopic Liver Transplantation	2004	Plachky, J; Hofer, S; Volkmann, M; Martin, E; Bardenheuer, Hj; Weigand, Ma	40	2,67
92	Clinical Predictors of Pulmonary Hypertension in Patients Undergoing Liver Transplant Evaluation	2000	Pilatis, Nd; Jacobs, Le; Rerkpattanapipat, P; Kotler, Mn; Owen, A; Manzarbeitia, C; Reich, D; Rothstein, K; Munoz, Sj	40	2,11
93	Pulmonary Thromboembolism During Liver Transplantation: Possible Association With Antifibrinolytic Drugs and Novel Treatment Options	2000	O'connor, Cj; Roozeboom, D; Brown, R; Tuman, Kj	39	2,05
94	Predictive Factors of Hyperfibrinolytic Activity During Liver-Transplantation in Cirrhotic-Patients	1994	Steib, A; Gengenwin, N; Freys, G; Boudjema, K; Levy, S; Otteni, Jc	39	1,56
95	Aprotinin Administration and Pulmonary Thromboembolism During Orthotopic Liver Transplantation: Report of Two Cases	2001	Fitzsimons, Mg; Peterfreund, Ra; Raines, De	38	2,11
96	Pharmacokinetics of Morphine in Two Children Before and After Liver-Transplantation	1986	Shelly, Mp; Cory, Ep; Park, Gr	38	1,15

97	The Safety of Modern Hydroxyethyl Starch in Living Donor Liver Transplantation: A Comparison With Human Albumin	2009	Mukhtar, Ahmed; Aboulfetouh, Fawzia; Obayah, Gihan; Salah, Maged; Emam, Mohamed; Khater, Yehia; Akram, Ramzia; Hoballah, Aly; Bahaa, Mohamed; Elmeteini, Mahmoud; Hamza, Alaa	37	3,7
98	Association Between Central Venous Pressure and Blood Loss During Hepatic Resection in 984 Living Donors	2009	Kim, Y. K.; Chin, J. H.; Kang, S. J.; Jun, I. G.; Song, J. G.; Jeong, S. M.; Park, J. Y.; Hwang, G. S.	37	3,7
99	Thromboelastometry For Guiding Bleeding Management of The Critically Ill Patient: A Systematic Review of The Literature	2014	Haas, T.; Goerlinger, K.; Grassetto, A.; Agostini, V.; Simioni, P.; Nardi, G.; Ranucci, M.	36	7,2
100	Anesthesia Care For Adult Live Donor Hepatectomy: Our Experiences With 100 Cases	2007	Chhibber, Ashwani; Dziak, Jason; Kolano, Jefferey; Norton, J. Russell; Lustik, Stewart	36	3
101	A Matched Comparison Study of Medical and Psychiatric Complications and Anesthesia and Analgesia Requirements in Methadone-Maintained Liver Transplant Recipients	2004	Weinrieb, Rm; Barnett, R; Lynch, Kg; Depiano, M; Atanda, A; Olthoff, Km	36	2,4
102	Blood-Transfusion Requirements and Blood Salvage in Donors Undergoing Right Hepatectomy For Living Related Liver Transplantation	2003	Lutz, Jt; Valentin-Gamazo, C; Gorlinger, K; Malago, M; Peters, J	36	2,25
103	Clinical-Evaluation of Autotransfusion During Liver-Transplantation	1991	Kang, Yg; Aggarwal, S; Virji, M; Pasculle, Aw; Lewis, Jh; Freeman, Ja; Martin, Lk	36	1,29

Table II. Distribution of first authors for 103 studies with most citations related to liver transplantation in the anesthesia literature

First Author	n	%	First Author	n	%
Massicotte, L	6	5.8	Lerner, AB	1	1.0
Kang, Y	3	2.9	Lutz, JT	1	1.0
Dewolf, Am	3	2.9	Mallett, Sv	1	1.0
Biancofiore, G	3	2.9	Mandell, MS	1	1.0
Biais, M	2	1.9	Mangus, R. S.	1	1.0
Ozier, Y	2	1.9	Marcel, RJ	1	1.0
Schumann, R	2	1.9	Marquez, J	1	1.0
Steib, A	2	1.9	Matthieu, Biais	1	1.0
Veroh, P	2	1.9	Mcnicol, Pl	1	1.0
Bodenham, A	1	1.0	Morris, Jj	1	1.0
Borland, Lm	1	1.0	Mukhtar, Ahmed	1	1.0
Borromeo, CJ	1	1.0	Navalgund, Aa	1	1.0
Bottiger, BW	1	1.0	Niemann, Claus U	1	1.0
Boylan, JF	1	1.0	O'Connor, CJ	1	1.0
Braunfeld, MY	1	1.0	Oshita, K	1	1.0
Carmichael, Fj	1	1.0	Otte, JB	1	1.0
Carton, Eg	1	1.0	Paulsen, Aw	1	1.0
Cheng, Ey	1	1.0	Pereboom, Ilonat.A	1	1.0
Chhibber, Ashwani	1	1.0	Pilatis, ND	1	1.0
Coakley, Margaret	1	1.0	Plachky, J	1	1.0
Dalmau, A	1	1.0	Prager, Mc	1	1.0

Deboer, Marieke T	1	1.0	Rayes, N	1	1.0
Dejonge, J	1	1.0	Reich, DL	1	1.0
Dellarocca, G	1	1.0	Roullet, S	1	1.0
Douning, Lk	1	1.0	Sakai, T.	1	1.0
Ellis, Je	1	1.0	Schemmer, P.	1	1.0
Faybik, P	1	1.0	Schroeder, RA	1	1.0
Findlay, JY	1	1.0	Shangraw, Re	1	1.0
Fitzsimons, MG	1	1.0	Shelly, Mp	1	1.0
Ganter, Michael T.	1	1.0	Siniscalchi, A	1	1.0
Glanemann, M	1	1.0	Sopher, M	1	1.0
Goerlinger, K.	1	1.0	Starkel, P	1	1.0
Haas, T.	1	1.0	Suriani, RJ	1	1.0
Harding, SA	1	1.0	Swygert, Th	1	1.0
Haruta, H	1	1.0	Takei, Y	1	1.0
Herbstreit, F.	1	1.0	Tamura, Sumihito	1	1.0
Hilmi, I. A.	1	1.0	Taura, P	1	1.0
Kaspar, M	1	1.0	Vanvugt, J. L. A.	1	1.0
Kettner, SC	1	1.0	Watson, C. J. E.	1	1.0
Khoury, Gf	1	1.0	Wax, David B	1	1.0
Kim, Y. K	1	1.0	Weinrieb, RM	1	1.0
Koelzow, H	1	1.0	Wikkelse, A. J	1	1.0
Kuo, PC	1	1.0	Xia, Victor W	1	1.0
Langle, F	1	1.0			

n: Frequency

Table III. Distribution of first author affiliation for 103 studies with most citations related to liver transplantation in the anesthesia literature

Affiliation	Frequency	%
University of Pittsburgh Medical Center	9	8.8
Centre Hospitalier del'University Montreal	6	5.8
Baylor University medical center, Dallas	6	5.8
University of California	5	4.9
Universitäts Klinik Essen, Germany	3	2.8
University of Vienna	3	2.8
Royal Free Hospital, London	3	2.9
Addenbrookes Hospital	3	2.8
Azienda Ospedaliera Universitaria Pisana	2	1.9
Centre Hospitalo-Universitaire de Bordeaux	2	1.9
Erasmus University Medical Center	2	1.0
Hospital Pellegrin CHU, Bordeaux	2	1.9
Mayo Clinic	2	1.9
Mount Sinai School of Medicine	2	1.9
New England Medical Center, Boston	2	1.9
Universite Paris-Sud,	2	1.9
Paris Descartes University	2	1.9
University of Heidelberg	2	1.9
Albert Einstein Medical Center	1	1.0
Austin Hospital, Melbourne	1	1.0
BethIsrael Deaconess Medical Center, Boston	1	1.0
Birmingham University	1	1.0
Cairo University	1	1.0
Charite Campus Virchow, Berlin, Germany	1	1.0
Children's Hospital of Pittsburgh	1	1.0
Cisanello Hospital	1	1.0
Duke University School of Medicine	1	1.0
Froedtert memorial lutheran hospital	1	1.0
Hôpitaux Universitaires, Strasbourg, France	1	1.0
Herlev Hospital, University of Copenhagen	1	1.0
Hiroshima University School of Medicine	1	1.0
Hospital Clinic, University of Barcelona	1	1.0

Humboldt University Berlin	1	1.0
Indiana University School of Medicine	1	1.0
Jichi Medical School, Japan	1	1.0
Lahey Clinic	1	1.0
Massachusetts General Hospital	1	1.0
Oregon Health&Science University	1	1.0
Prnceps Dâ Espanya Hospital, Barcelona	1	1.0
Ruprecht-Karls-University	1	1.0
Rush Medical College	1	1.0
St James's University Hospital	1	1.0
St Vincent's Medical Center	1	1.0
The Toronto Hospital	1	1.0
The University of Chicago Hospitals and Clinics	1	1.0
Toronto Western Hospital	1	1.0
Triemli City Hospital Zurich	1	1.0
Ucla school Of Medicine	1	1.0
Univ of Groningen	1	1.0
Universite Â' Catholique de Louvain	1	1.0
University Children's Hospital Zurich	1	1.0
University Drive C, Pittsburgh	1	1.0
University Hospital Strasbourg-Hautepierre	1	1.0
University of Colorado Health Sciences Center	1	1.0
University of Groningen, Netherlands	1	1.0
University of Maryland, Baltimore	1	1.0
University of Modena and Reggio Emilia	1	1.0
University of North Carolina	1	1.0
University of Pennsylvania	1	1.0
University of Rochester	1	1.0
University of Rome	1	1.0
University of Tokyo	1	1.0
University of Ulsan College of Medicine	1	1.0

Table IV. Distribution according to features of 103 studies with most citations related to liver transplantation in the anesthesia literature

	Subgroup	n	Total Citation mean ± SD	p	Annual Citation mean ± SD	p
Year	<1990	11	109,73±120,20		3,35±3,50	
	1990-1994	15	82,93±92,88		3,13 ±3,40	
	1995-1999	17	59,94±20,23	0,697 ^a	2,70±0,94	<0,001 ^a
	2000-2004	24	66,46±49,42		3,99±2,90	
	2005-2009	25	84,52±71,37		7,40±6,47	
	>2010	11	57,91 ±16,81		9,35 ±3,32	
Author's Continents	European	44	85,07±80,19	0,241 ^b	6,49±5,96	0,009 ^b
	Non-European	59	69,02 ±58,02		3,86±2,79	
Author's Countries	USA	47	69,23±63,46		3,46 ±2,75	
	France	10	70,80 ±25,97		5,18 ±3,04	
	England	8	111,0 ±123,75		6,11±5,26	
	Germany	7	80,43±88,17		6,07 ±5,61	
	Canada	6	82,33 ±33,31		7,09 ±2,25	
	Italy	5	63,40 ±30,02		5,62 ±3,77	
	Netherlands	5	79,20±51,95		9,02 ±5,55	
	Japan	3	68,00 ±20,66	0,519 ^a	4,48 ±1,70	0,018 ^a
	Austria	3	51,00 ±1,73		2,64 ±0,56	
	Switzerland	2	206,0±240,41		20,69±19,07	
	Spain	2	85,50±23,33		4,18 ±1,67	
	Belgium	1	82		4,82	
	Australia	1	46		1,84	
	Denmark	1	53		6,63	
	Egypt	1	37		3,7	
	South Korea	1	37		3,7	
Article type	Prospective Clinical	46	74,48±65,81		4,55 ±3,43	
	Retrospective	22	62,82±23,52	0,094 ^a	5,17 ±3,50	0,003 ^a
	Case series	12	50,92±15,29		2,40 ±1,33	
	Rewiev	11	120,64±134,97		9,73 ±9,15	
	RCT	6	116,5±84,42		5,86±5,35	
	Other	3	44,0±10,53		2,68 ±0,83	
	Experimental	2	94,0±59,39		3,51 ±1,90	
	Meta analysis	1	50		4,17	
Physician Area	Anesthetist	86	73,64 ±69,66	0,320 ^b	4,61 ±4,49	0,021 ^b
	Non-Anesthetist	17	87,18 ±62,87		6,89 ±4,81	
Journal	Anesthesia And Analgesia	37	79,76 ±86,03		4,67 ±5,81	
	British Journal Of Anaesthesia	14	94,14 ±93,37		7,47 ±5,21	
	Liver Transplantation	10	63,30±32,78		4,65 ±2,92	
	Anesthesiology	10	74,20±38,17		2,69 ±1,34	
	Transplantation	7	104,71 ±82,82		6,79 ±4,70	
	Journal Of Cardiothoracic And Vascular Anesthesia	6	69,67 ±38,49		4,61±3,33	
	Acta Anaesthesiologica Scandinavica	3	47,00 ±8,71		4,38 ±1,99	
	European Journal Of Anaesthesiology	2	45,0 ±5,65	0,348 ^a	2,90 ±0,03	0,176 ^a
	Canadian Journal Of Anaesthesia	2	91,5±4,95		5,78 ±0,71	
	Journal Of Clinical Anesthesia	2	53,5 ±2,12		2,57 ±0,44	
	Transplantation Proceedings	2	51,5 ±2,12		4,29 ±0,17	
	Anaesthesia	2	44,5±2,12		3,53 ±2,23	
	Pediatric Transplantation	1	82		4,82	
	Current Opinion in Anesthesiology	1	52		4,73	
	Transplant International	1	49		3,77	
	American Journal Of Transplantation	1	42		14	
	Minerva Anesthesiologica	1	36		7,2	
	Anaesthesia And Intensive Care	1	46		1,84	
Journal Countries	USA	77	76,14 ±67,86		4,65 ±4,68	
	England	18	83,17 ±84,35	0,249 ^a	6,52 ±4,93	0,380 ^a
	Swedish	3	47,0 ±8,71		4,38 ±1,99	
	Canada	2	91,5 ±4,95		5,78 ±0,71	
	Austria	1	49		3,77	

	Italy	1	36		7,2	
	Australia	1	46		1,84	
Continent of the journal	European	23	74,91 ±75,94	0,513 _b	6,15 ±4,47	0,136 ^b
	Non-European	80	76,15±66,69		4,65 ±4,60	
Journal Index	SCI	95	77,96±70,83	0,131 _b	4,96 ±4,67	0,510 ^b
	SCI-E	8	51,13 ±14,08		5,21 ±3,89	
Study Area	Transfusion	17	87,88 ±40,38	0,097 _a	5,98 ±3,40	0,017 ^a
	Thromboelastography	14	139,79 ±151,21		9,07 ±8,48	
	Hemodynamic Monitoring	10	61,30 ±23,75		4,45 ±2,96	
	Anesthesia Management	8	55,25 ±25,09		2,72 ±1,11	
	Surgery	8	53,75 ±15,07		5,02 ±3,88	
	Pharmacology	8	56,0 ±13,33		2,27 ±0,69	
	Pulmonary Hypertension	8	57,63 ±13,26		2,72 ±0,79	
	Pulmonary Thromboembolism	6	43,83 ±6,61		2,90 ±1,83	
	Fluid Management	4	62,25 ±26,92		3,89 ±1,35	
	Perioperative care	4	106,75 ±115,45		6,48 ±6,64	
	Regional Anesthesia, Analgesia-Pain	3	49,67 ±4,50		3,10 ±0,64	
	Intensive Care	3	71,0 ±34,64		5,08 ±4,34	
	Renal Failure	3	64,67 ±19,14		8,58 ±6,88	
	History	2	78,50 ±4,95		7,76 ±4,16	
	Hematology-Oncology	2	43,0 ±5,65		2,16 ±0,84	
	Histopathology	1	136		4,86	
	Complication	1	68		2,13	

a: Kruskal Wallis test, b: Mann-Whitney U test

DISCUSSION

The scientific research organization of the “Institute for Scientific Information (ISI)” was founded in America. The basic function of the Institute for Scientific Information is to determine journals to be included in the scope of the index and to periodically check these journals. Currently, ISI does not include all

journals publishing scientific articles in the index. They select journals that abide by certain quality conditions. It also has a special scientific bibliographic search database for ISI, citations and index. It contains information about original articles published after 1945. Using the Web of Science, it is possible to reach valuable information like academic personnel citation statistics and mean citation indexes in the database^{7,8}. This information is requested for professional advancement and promotion.

The first bibliographic study by Garfield in 1987 was entitled “100 citation classics from the Journal of the American Medical Association” and published in the “Journal of the American Medical Association (JAMA)”⁹. Since then, many articles have investigated and presented the “most cited articles” not just in general journals but in specific journals^{10,11}.

Our study is the first to evaluate and analyze the top 103 articles with most citations related to liver transplantation in the anesthesia literature. The articles with most citations in the literature about this topic had 456 citations. The most cited studies related to the topic were about transfusion practice in liver transplantation. This was followed by articles about thromboelastography and hemodynamic monitoring. The study topic with highest total citations was thomboelastography with 139 citations.

There was no significant correlation determined between the continent of the journal and journal index with total and annual citation numbers for the articles. There was no statistically significant correlation found between the author's continent and total citation numbers. Additionally, authors from Europe had mean annual citation numbers that were significantly higher than authors from areas outside of Europe.

Ozbilgin et al. in a 2017 study of the top 100 articles with most citations about the topic of

liver transplantation determined the mean citation number was 252.3. The most cited article was a study by Feng et al. entitled "Characteristics associated with liver graft failure: the concept of a donor risk index" with 677 citations. In the same study, of the total of 100 articles, 42 were prospective clinical studies, 25 were retrospective and¹³ were review studies¹². McDowell et al. investigated articles with most citations in the field of pediatric liver transplantation and reported the mean citation number was 166¹³. Yilmaz et al. in a bibliometric study assessing the scientific performance of anesthesia clinics in Turkey determined the mean citation number was 9.9 and 376 of these studies were randomized controlled studies, 98 were observations and 66 were laboratory studies¹⁴. In our study the mean citation number was found to be 75.8. The most cited article was a study by Kang et al. with 456 citations. The studies included 46 prospective clinical studies, 22 retrospective and 12 case series. Of the 103 most cited articles, 92.2% were SCI index journals and 7.8% were SCI-E index journals. However, the mean annual citation number was higher for articles published in SCI-E journals. When the total citation numbers are examined, the most cited were review and randomized controlled studies (RCS), with least citations for case studies. This result is considered to be due to reviews and guidelines being at the top of the evidence pyramid while case studies are at the base. When the top-cited 103 articles are investigated, the country with most publications was the USA. The organizations with most articles were again on the American continent.

When study numbers are investigated according to year, 25 articles were published from 2005-2009, 24 studies from 2000-2004, with 11 studies after 2010. When total citation numbers are investigated, the most citations were received by 11 studies published before

1990. Additionally, when the mean annual citation numbers are examined, as the years advanced, there was an increase observed in citation numbers. We think this result is affected by the developing information and technology in the field of liver transplantation. The study by Ozbilgin et al. observed an increase in mean annual numbers in spite of fewer publications in recent years¹².

Research in Scandinavian countries in the field of anesthesiology and intensive care from 1981 to 2000, ¹⁵ investigated the annual publication numbers in journals from Sweden, Norway, Finland and England over a 20-year period. Within this time, there was a significant increase in Finland and Norway compared to other countries and they reported that within these four countries, reference numbers increased in percentages within the last 20 years.

The first limitation of our study is that we used the WOS as search engine. It is known that different databases may display differences in citation numbers. Though additional citation numbers and mean annual citation numbers are traditional parameters to determine the scientific value of an article, the contribution of a study to science cannot be assessed using these parameters alone.

In conclusion, bibliographic articles created using scientific search engines illustrate the topics that researchers focus on. For healthy data analysis, it is recommended that these types of studies should be updated and rewritten at certain intervals.

Ethics Committee Approval: Hitit University Faculty of Medicine Clinical Research Ethics by the presidency of the board due to the design of the study board approval was not required.

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