Top 100 Most-Cited Articles on Spontaneous Intracerebral Hemorrhage: A Bibliometric Analysis

Syed Ali Raza Nasir[1], Jaleed Ahmed Gilani[2], Kaneez Fatima[1], Urooba Faheem[3], Omar Kazmi[4], Javed Siddiqi[5], Faisal Khosa[6]

Key words
- Bibliometric
- Brain hemorrhage
- Hypertensive intracerebral hemorrhage
- Primary intracerebral hemorrhage
- Spontaneous intracerebral hemorrhage

Abbreviations and Acronyms
ICH: Intracerebral hemorrhage

From the [1]Dow Medical College, Karachi, Pakistan; [2]Ziauddin Medical College, Karachi, Pakistan; [3]Department of Neurology, Banner University Medical Center, Tucson, Arizona, USA; [4]Division of Vascular Neurology and Neurocritical Care, Department of Neurology, Baylor College of Medicine, Houston, Texas, USA; [5]Chair of Neurosurgery, Riverside University Health System Medical Center, Moreno Valley, California, USA; and [6]Department of Radiology, Vancouver General Hospital, Vancouver, Washington, USA

To whom correspondence should be addressed:
Syed Ali Raza Nasir
[E-mail: alirazanasir727@gmail.com]

Supplementary digital content available online.

Citation: World Neurosurg. (2018) 110:445-449.
https://doi.org/10.1016/j.wneu.2017.09.077
Journal homepage: www.WORLDNEUROSURGERY.org

Available online: www.sciencedirect.com

BACKGROUND: **A bibliometric uses the citation count of an article to determine its impact on the clinical world. There is a paucity of literature concerning top article citations on spontaneous intracerebral hemorrhage (ICH). The main objective of this investigation was to bridge this gap and to provide understanding of the trends on the most influential articles written on this subject.**

METHODS: **The Scopus Library database was searched to determine the citations of all articles published on spontaneous ICH. Articles that focused on other forms of ICH, such as trauma-related hemorrhages, subarachnoid hemorrhages, or hemorrhages caused by anticoagulation, vascular malformations, or cavernomas, were excluded from our list. The articles were divided into 2 groups: "specific" articles, which focused specifically on spontaneous ICH, and "generalized" articles, which were about ICH in general, including spontaneous as well as other forms of ICH. We did not apply any time or study-type restriction in our search. The top 100 cited articles were selected and analyzed by 2 independent investigators.**

RESULTS: **J. Broderick was the author with most publications in the list ($n = 21$). The largest subset of spontaneous ICH articles was published in the 5-year periods from 1996 to 2000 and 2001 to 2005 ($n = 27$ each). The United States had the highest number of articles ($n = 49$). The journal with the highest number of top 100 cited articles was *Stroke*, with 39, followed by *Neurology* with 16.**

CONCLUSIONS: **Our study identifies the trends related to spontaneous ICH by analyzing the citation frequency of the most-cited articles in the field.**

INTRODUCTION

Bibliometric analysis is an efficient method of study to evaluate the impact of an article, the contribution of an author to a particular field, and to quantitatively analyze the most influential articles related to a particular field. Although citation count remains a debatable tool to assess the significance of articles, it is the most widely accepted.[1] It helps in identifying the trends that contribute to making a study more efficient in terms of readership. This technique has been used extensively to analyze publications in cardiology, radiology, gastroenterology, and various other fields.[2-6] Furthermore, bibliometrics aid in prioritizing research funding in this era of ever-increasing number of applications for grants for research.

Spontaneous intracerebral hemorrhage (ICH) affects 24.6 in 100,000 people annually and exerts a considerable burden on health care: mortality is 40.4% and most survivors are disabled.[7] Because of this burden, this topic has been subject to extensive research over the years. Bibliometric analyses have been reported on several subspecialties within neurology/neurosurgery, including neuroradiology and pediatric neurology, and on several individual topics in neurology such as multiple sclerosis, Guillain-Barré syndrome, headache, frontotemporal dementia, and subarachnoid hemorrhage.[8-14] However, to the best of our knowledge, there is a paucity of literature on bibliometric analysis on spontaneous ICH, and our study aims to provide an understanding of the trends on the most influential articles written on this subject.

METHODS

In December 2016, we conducted a bibliometric analysis of the top 100 most-cited articles on spontaneous ICH. Institutional review board approval was not needed for our retrospective study because we evaluated data that were publicly available.

Elsevier's Scopus, containing a database of about 22,000 journals, was used to search for relevant articles by 2 independent reviewers (A.R. and J.A.). Compared with PubMed, Google Scholar, or Web of Science, Scopus has been shown to have coverage that is broader in scope as far as scientific publications are concerned.[15] Articles that contained

the key phrases "spontaneous intracerebral hemorrhage," "primary intracerebral hemorrhage," or "hypertensive intracerebral hemorrhage" in their title or abstract, with their main focus on ICH, were included in our list. Also, articles containing the key phrase "intracerebral hemorrhage" in their title, abstract, or main article were examined by a board-certified neurologist, and articles relevant to our bibliometric were added to the list, such as those on spontaneous cerebral microbleeds. Articles on subarachnoid hemorrhage; hemorrhage caused by trauma, anticoagulation, vascular malformations, cavernomas, use of phenylpropanolamine, or oral contraceptives; and collagenase-induced ICH were excluded. Time limitations were not implemented in the investigation, nor did we impose any restriction on the basis of study types, availability of an abstract, and human versus nonhuman research subjects.

Both reviewers searched Scopus over the same period and were blinded to each other's findings. The selected articles were arranged using the "cited by" option. A final list of 100 top-cited articles arranged in descending order was compiled; and the list from each reviewer was compared. A difference of 7% was found between the lists. The discrepancies were solved by discussion until a consensus was reached. The final list was then analyzed using the modified approach of the methods by Lim et al.[16] for the following information about each article: article title, authors, journal, Scopus citations, year, citation per year, number of authors, country of origin of the primary author, and study type (specific or generalized).

The articles were divided into 2 groups: "specific" and "generalized" articles. Specific articles were those that explicitly focused on spontaneous ICH. Generalized articles did not specify the cause of the ICH in their study. Of the top 100 most-cited articles, 48 were specific, whereas 52 were generalized. Certain bibliometric aspects of both the categories were compared. The data were analyzed using SPSS version 23 (IBM Corp., Armonk, New York, USA).

RESULTS

Citations

The citation count of articles ranged from 175 to 962 (median number of citations, 243). Articles are listed in Supplementary Table 1 according to their citation counts.

Citations Per Year

The citations per year ranged from 4.0 to 152.5 (median, 16.2). The rank according to the average number of citations per year is shown in Supplementary Table 1. The change in rank compared with ranking based on number of citations ranged from −63 to +81.

Number of Authors

The number of authors in each article ranged from 1 to 26 (median, 6). The authors involved in more than 5 publications from the list are shown in Table 1; J. Broderick is the author with most publications ($n = 21$).

Year of Publication

The articles were published between 1961 and 2013 and most were published in the 5-year periods 1996–2000 and 2001–2005 ($n = 27$ each). Figure 1 shows the graphic distribution of the 100 top-cited articles by 5-year intervals of publication.

Countries

Fourteen countries contributed to the list of 100 top-cited articles, with the United States contributing most articles ($n = 59$). Figure 2 shows countrywise distribution of the articles.

Journals

The number of journals that published articles included in the 100 top-cited list was 18. *Stroke* contributed the most articles to this list ($n = 39$). A list of the journals publishing most of the articles along with their respective impact factors is given in Table 2.

Specificity

Forty-eight articles from the list were specifically related to spontaneous ICH, whereas 52 were about ICH in general that did not specify the variant of ICH. Table 3 shows a comparison between the 2 types of articles.

Table 1. Authors with ≥6 Articles in the Top 100 Articles

Author	Number of Articles in List	Authorship Position		
		First	Last	Other
Broderick, J.	21	8	1	12
Brott, T.	12	2	7	3
Hoff, J.T.	10	0	1	9
Diringer, M.N.	8	2	2	4
Keep, R.F.	8	0	2	6
Tomsick, T.	7	0	0	7
Xi, G.	7	3	2	2
Kase, C.	6	0	0	6
Mayer, S.A.	6	4	0	2
Sauerbeck, L.	6	0	1	5

DISCUSSION

Bibliometric studies allow the reader to gain an insight into the history and development of a particular specialty over time.[9] Likewise, identification of the citation classics can facilitate the recognition of academic advances in a particular field as well as help identify the emerging topics and future directions in a particular discipline.[9] Therefore, bibliometric studies can guide physicians clinically by not only providing them with a historical background of their particular discipline but also keeping them up to date with the altering landscape of scientific questions being asked and the knowledge being accumulated within a particular discipline.[9]

In our study, we found that the highest number of citations for an article on spontaneous ICH was 962. This figure does not rank high compared with bibliometrics in other fields in neurology/neurosurgery. For instance, 4384 was the highest count in the bibliometric on neuroimaging, 2273 for subarachnoid hemorrhage, and 1690 for multiple sclerosis.[8,9,12] However, a bibliometric performed on Guillain-Barré syndrome showed that the most-cited article was cited 812 times, lower than our top-cited article.[13] Because our topic concerns a specific subject in neurology/neurosurgery, a deduction can be made that spontaneous ICH is a topic frequently cited. However, compared with subarachnoid hemorrhage, which is a topic of relatively equal specificity and significance, our topic fails to exert the same impact on readership. The reason

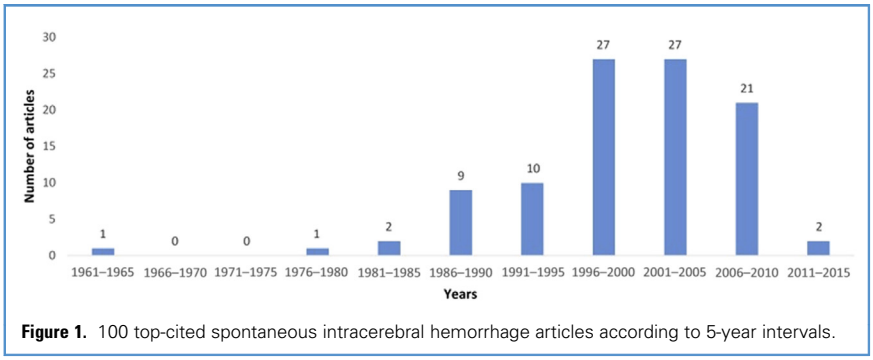

Figure 1. 100 top-cited spontaneous intracerebral hemorrhage articles according to 5-year intervals.

for this situation may lie in the complicated management paradigms of subarachnoid hemorrhage treatment, which have been debated extensively over the years in the literature, whereas the management of ICH has been relatively straightforward.

The ranking of articles on the basis of citation per year was considerably different from the original ranking based on number of citations only. The article with the highest average citations per year was "Risk factors for ischaemic and intracerebral haemorrhagic stroke in 22 countries (the INTERSTROKE study): A case-control study" by O'Donnell et al., which was originally ranked at number 3. It was published in 2010 and highlights the importance of the impact of recent and up-to-date research in neurology/neurosurgery.

One of the articles was published in 1961. This finding is unusual because from 1961 until 1978, no other article was cited enough times to be a part of our top 100 most-cited list. During this period of absent impactful articles on spontaneous ICH, high-impact articles were being published on other fields in neurology/neurosurgery, such as subarachnoid hemorrhage.[17-20] In general, bibliometric analyses do tend to have a relatively silent period of impactful articles before 1980. One reasonable explanation for this trend, which is also observed to a certain extent in our bibliometric, could be that the articles published during this period were published in alternative media and were likely missed because the list was compiled from an online computed database. Also, because medicine is an ever-evolving field with new guidelines and principles being published from time to time, the reason for minimum impactful articles before 1980 seems justified. Similar to various other analyses, our bibliometric also has a peak period from 1996 to 2005, with more than half of the most-cited articles being published during this 10-year period. Only 2 articles published since 2011 made it to the list, likely because several years are needed for an article to gain a sufficient number of citations.[21]

Fifteen authors were found to have 5 or more publications in the top 100 list. This is a notable finding because bibliometrics analyses of other fields (e.g., emergency medicine, dermatology, neuroimaging, and cardiovascular magnetic resonance) had 3, 3, 6, and 14 authors, respectively, with 5 or more publications.[12,22-24] The trend generally observed in bibliometrics is that those on a broader category have fewer authors with a large number of publications. Ours, being a study on a relatively specific topic, is expected to have a certain pool of renowned authors publishing most articles. Yet, even then, certain authors have an immensely significant level of contribution. Among them, the author with the most articles is J. Broderick. His name appears in more than one fifth of all the articles on our list. This is a huge contribution to spontaneous ICH. Other frequent contributors to this field are T. Brott and J.T. Hoff, with 12 and 10 publications, respectively. It can be inferred from this finding that a few eminent dedicated researchers contribute to spontaneous ICH on a scale not observed in other bibliometrics. These researchers are more likely to receive academic promotions as a result of their notable contributions in the literature.[25]

Stroke contributes the most articles to our list ($n = 39$), followed by *Neurology* and *Journal of Neurosurgery* ($n = 16$ and $n = 11$, respectively). All these are specific journals catering to a particular field, and according to the Bradford law, this observation is justified.[26] However, several high-impact articles have been published in general medical journals such as *The Lancet* and *New England Journal of Medicine*. The Bradford law, implying that a few core journals specific to a particular field extract most citations, holds true to a great extent in our study. Therefore, for researchers, editors, and readers, publications in field-specific journals related to spontaneous ICH are likely to be more impactful than those in general medical journals.

Certain subjects remain important to spontaneous ICH even if the articles have not specified the cause of ICH, such as the role of radiologic techniques, the pathogenesis of the inflammatory process, and the treatment options after ICH.[27-29] For this reason, we considered it important to include such articles in our list and to compare their bibliometric aspects with specific articles. In comparing articles specific to spontaneous ICH and those that do not specify the cause of ICH

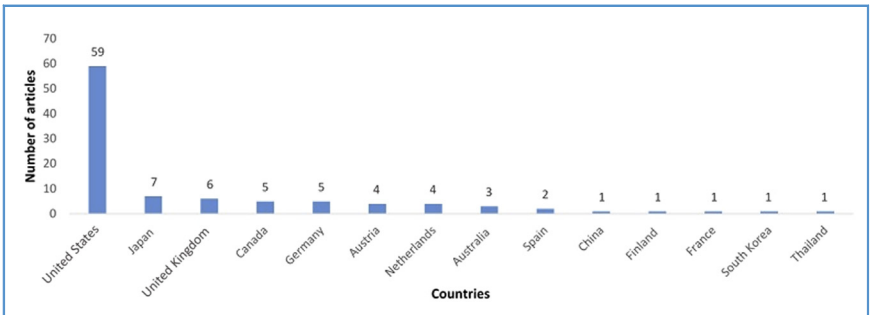

Figure 2. 100 top-cited spontaneous intracerebral hemorrhage articles according to country of origin.

Table 2. Top-Cited Articles According to Journal and Their Impact Factors (Only Journals with ≥2 Articles Are Shown)

Journal	Number of Articles	Impact Factor
Stroke	39	5.79
Neurology	16	8.17
Journal of Neurosurgery	11	3.44
New England Journal of Medicine	7	59.56
The Lancet	5	44.00
Brain	3	10.10
Journal of Cerebral Blood Flow and Metabolism	3	4.93
The Lancet Neurology	3	23.47
American Journal of Neuroradiology	2	3.12
Annals of Neurology	2	9.64
Critical Care Medicine	2	7.42

(generalized articles), it was found that the bibliometric aspects were not significantly different. There were roughly an equal number of both types of articles in our top 100 list. Even although *Stroke* published proportionately more specific articles, the association was not found to be statistically significant (χ^2 test, $P = 0.08$). It can therefore be deduced that regardless of whether an article is written specifically about spontaneous ICH or about ICH in general, the impact on readership is likely the same.

Table 3. Comparison of Specific Articles and Generalized Articles

Compared Entity	Specific Articles (n = 48)	Generalized Articles (n = 52)
Median number of authors	6	6
Median number of citations	238.5	245
Articles published from 1996–2000 and 2001–2005	23	31
Country of origin (United States)	21	38
Articles published in *Stroke*	23	16
Articles published by Broderick, J.	12	9

Consistent with other bibliometrics, most of the articles in our top 100 most-cited list were published in the United States. The United States is at the forefront of scientific research and academics, and hence, this trend is expected and in line with other bibliometrics.

Our study has several limitations. First, certain studies that did not contain "intracerebral hemorrhage" even once in their entire article would not have been picked up by Scopus. However, because we searched the whole length of the article for the keywords and not just the title or abstract, it is highly unlikely that a study would not have used "intracerebral hemorrhage" at all in its discussion. Second, Scopus is likely to miss impactful articles published recently, because they have not gathered enough citations in the short time since being published. Examples of such articles are the CLEAR-IVH (Clot Lysis Evaluation of Accelerated Resolution of Intraventricular Hemorrhage), MISTIE (Minimally-Invasive Surgery Plus rtPA for Intracerebral Hemorrhage Evacuation), and ATACH (Antihypertensive Treatment of Acute Cerebral Hemorrhage) trials, which are considered highly impactful in the neurology/neurosurgery, yet they do not have sufficient citations because they are relatively recent studies.[30-32] Third, our study did not factor in the impact of self-citation. Considering that the top authors have such a significant number of studies in the list, a research collaboration may be suggestive. Several articles that appeared in our original list were not relevant to our study and were therefore excluded after being examined by a certified neurologist.

CONCLUSIONS

Our study identifies the trends observed in publications in spontaneous ICH, which may help the authors and editors of journals to channel their efforts to bring about more impactful articles in terms of readership and also help in prioritizing research funding. High-impact articles are usually published in field-specific journals, have been published from the United States, are usually authored by a pool of eminent neurologists, and were published between 1996 and 2005.

REFERENCES

1. Moed HF. The impact-factors debate: the ISI's uses and limits. *Nature*. 2002;415:731-732.
2. Shahzeb Khan M, Fatima K, Bin Riaz I, Butler J, Manning WJ, Khosa F. The 20 most-cited articles in echocardiography literature. *Eur Heart J*. 2017;38:74-78.
3. O'Keeffe ME, Hanna TN, Holmes D, Marais O, Mohammed MF, Clark S. The 100 most-cited original articles in cardiac computed tomography: A bibliometric analysis. *J Cardiovasc Comput Tomogr*. 2016;10:414-423.
4. Dolan RS, Hanna TN, Warraich GJ, Johnson JO, Khosa F. The top 100 articles in the radiology of trauma: a bibliometric analysis. *Emerg Radiol*. 2015;22:667-675.
5. Loomes DE, van Zanten SV. Bibliometrics of the top 100 clinical articles in digestive disease. *Gastroenterology*. 2013;144:673-676.
6. Shuaib W, Khan MS, Shahid H, Valdes EA, Alweis R. Bibliometric analysis of the top 100 cited cardiovascular articles. *Am J Cardiol*. 2015;115:972-981.
7. van Asch CJ, Luitse MJ, Rinkel GJ, van der Tweel I, Algra A, Klijn CJ. Incidence, case fatality, and functional outcome of intracerebral haemorrhage over time, according to age, sex, and ethnic origin: a systematic review and meta-analysis. *Lancet Neurol*. 2010;9:167-176.
8. Aleixandre-Benavent R, Alonso-Arroyo A, Gonzalez de Dios J, Vidal-Infer A, Gonzalez-Munoz M, Sempere AP. Bibliometric profile of the global scientific research on multiple sclerosis (2003-2012). *Mult Scler*. 2015;21:235-245.
9. Alotaibi NM, Nassiri F, Badhiwala JH, Witiw CD, Ibrahim GM, Macdonald RL, et al. The most cited works in aneurysmal subarachnoid hemorrhage: a bibliometric analysis of the 100 most cited articles. *World Neurosurg*. 2016;89:587-592.e6.
10. Fernandez-Fernandez EM, Pardo-De la Vega R, Amigo-Bello C, Solis-Sanchez G. Comparison of bibliometric indicators for neuropaediatrics in Revista de Neurologia and Anales de Pediatria over one decade. *Rev Neurol*. 2013;57:9-16 [in Spanish].
11. Guido D, Morandi G, Palluzzi F, Borroni B. Telling the story of frontotemporal dementia by bibliometric analysis. *J Alzheimers Dis*. 2015;48:703-709.
12. Kim HJ, Yoon DY, Kim ES, Lee K, Bae JS, Lee JH. The 100 most-cited articles in neuroimaging: A bibliometric analysis. *NeuroImage*. 2016;139:149-156.
13. Kim JE, Kim JK, Park KM, Kim Y, Yoon DY, Bae JS. Top-100 cited articles on Guillain-Barré syndrome: a bibliometric analysis. *J Peripher Nerv Syst*. 2016;21:329-338.

14. Robert C, Wilson CS, Lipton RB and Arreto CD, Growth of headache research: A 1983-2014 bibliometric study [e-pub ahead of print]. Cephalalgia. https://doi.org/10.1177/0333102416678636. Accessed February 16, 2017.

15. Falagas ME, Pitsouni EI, Malietzis GA, Pappas G. Comparison of PubMed, Scopus, Web of Science, and Google Scholar: strengths and weaknesses. *FASEB J*. 2008;22:338-342.

16. Lim KJ, Yoon DY, Yun EJ, Seo YL, Baek S, Gu DH, et al. Characteristics and trends of radiology research: a survey of original articles published in AJR and Radiology between 2001 and 2010. *Radiology*. 2012;264:796-802.

17. Ferguson GG. Physical factors in the initiation, growth, and rupture of human intracranial saccular aneurysms. *J Neurosurg*. 1972;37:666-677.

18. Hunt WE, Hess RM. Surgical risk as related to time of intervention in the repair of intracranial aneurysms. *J Neurosurg*. 1968;28:14-20.

19. Locksley HB. Natural history of subarachnoid hemorrhage, intracranial aneurysms and arteriovenous malformations. *J Neurosurg*. 1966;25:219-239.

20. Weir B, Grace M, Hansen J, Rothberg C. Time course of vasospasm in man. *J Neurosurg*. 1978;48:173-178.

21. Seglen PO. Citation rates and journal impact factors are not suitable for evaluation of research. *Acta Orthop Scand*. 1998;69:224-229.

22. Dubin D, Hafner AW, Arndt KA. Citation classics in clinical dermatologic journals. Citation analysis, biomedical journals, and landmark articles, 1945-1990. *Arch Dermatol*. 1993;129:1121-1129.

23. Khan MS, Ullah W, Riaz IB, Bhulani N, Manning WJ, Tridandapani S, et al. Top 100 cited articles in cardiovascular magnetic resonance: a bibliometric analysis. *J Cardiovasc Magn Reson*. 2016;18:87.

24. Shuaib W, Acevedo JN, Khan MS, Santiago LJ, Gaeta TJ. The top 100 cited articles published in emergency medicine journals. *Am J Emerg Med*. 2015;33:1066-1071.

25. Stossel TP. Volume: papers and academic promotion. *Ann Intern Med*. 1987;106:146-149.

26. Brookes BC. Bradford's law and the bibliography of science. *Nature*. 1969;224:953-956.

27. Kidwell CS, Chalela JA, Saver JL, Starkman S, Hill MD, Demchuk AM, et al. Comparison of MRI and CT for detection of acute intracerebral hemorrhage. *JAMA*. 2004;292:1823-1830.

28. Mayer SA, Brun NC, Begtrup K, Broderick J, Davis S, Diringer MN, et al. Efficacy and safety of recombinant activated factor VII for acute intracerebral hemorrhage. *N Engl J Med*. 2008;358:2127-2137.

29. Wang J, Dore S. Inflammation after intracerebral hemorrhage. *J Cereb Blood Flow Metab*. 2007;27:894-908.

30. Morgan T, Awad I, Keyl P, Lane K, Hanley D. Preliminary report of the clot lysis evaluating accelerated resolution of intraventricular hemorrhage (CLEAR-IVH) clinical trial. *Acta Neurochir Suppl*. 2008;105:217-220.

31. Morgan T, Zuccarello M, Narayan R, Keyl P, Lane K, Hanley D. Preliminary findings of the minimally-invasive surgery plus rtPA for intracerebral hemorrhage evacuation (MISTIE) clinical trial. *Acta Neurochir Suppl*. 2008;105:147-151.

32. Qureshi AI, Palesch YY, Barsan WG, Hanley DF, Hsu CY, Martin RL, et al. ATACH-2 Trial Investigators and the Neurological Emergency Treatment Trials Network. Intensive Blood-pressure lowering in patients with acute cerebral hemorrhage. *N Engl J Med*. 2016;375:1033-1043.

Conflict of interest statement: The authors declare that the article content was composed in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Received 5 April 2017; accepted 13 September 2017

Citation: World Neurosurg. (2018) 110:445-449.
https://doi.org/10.1016/j.wneu.2017.09.077

Journal homepage: ***www.WORLDNEUROSURGERY.org***

Available online: ***www.sciencedirect.com***

SUPPLEMENTARY DATA

Supplementary Table 1. List of Top 100 Most-Cited Articles on Spontaneous Intracerebral Hemorrhage by Citation Count

Rank	Article	Citations	Average Citations Per Year	Rank According to Average Citations Per Year
1.	Mayer SA, Brun NC, Begtrup K, Broderick J, Davis S, Diringer MN, Skolnick BE, Steiner T, Recombinant Activated Factor VIIIHTI. Recombinant activated factor VII for acute intracerebral hemorrhage. *N Engl J Med.* 2005;352:777-885.	962	87.5	4
2.	Broderick JP, Brott TG, Duldner JE, Tomsick T, Huster G. Volume of intracerebral hemorrhage. A powerful and easy-to-use predictor of 30-day mortality. *Stroke.* 1993;24:987-993.	934	40.6	17
3.	O'Donnell MJ, Xavier D, Liu L, Zhang H, Chin SL, Rao-Melacini P, Rangarajan S, Islam S, Pais P, McQueen MJ, Mondo C, Damasceno A, Lopez-Jaramillo P, Hankey GJ, Dans AL, Yusoff K, Truelsen T, Diener HC, Sacco RL, Ryglewicz D, Czlonkowska A, Weimar C, Wang X, Yusuf S, investigators I. Risk factors for ischaemic and intracerebral haemorrhagic stroke in 22 countries (the INTERSTROKE study): a case-control study. *Lancet.* 2010;376:112-123.	915	152.5	1
4.	Mendelow AD, Gregson BA, Fernandes HM, Murray GD, Teasdale GM, Hope DT, Karimi A, Shaw MD, Barer DH for the STICH Investigators. Early surgery versus initial conservative treatment in patients with spontaneous supratentorial intracerebral haematomas in the International Surgical Trial in Intracerebral Haemorrhage (STICH): a randomised trial. *Lancet.* 2005;365:387-397.	880	80.0	5
5.	Qureshi AI, Tuhrim S, Broderick JP, Batjer HH, Hondo H, Hanley DF. Spontaneous intracerebral hemorrhage. *N Engl J Med.* 2001;344:1450-1460.	864	57.6	11
6.	Brott T, Broderick J, Kothari R, Barsan W, Tomsick T, Sauerbeck L, Spilker J, Duldner J, Khoury J. Early hemorrhage growth in patients with intracerebral hemorrhage. *Stroke.* 1997;28:1-5.	840	44.2	14
7.	Morgenstern LB, Hemphill JC, 3rd, Anderson C, Becker K, Broderick JP, Connolly ES, Jr., Greenberg SM, Huang JN, MacDonald RL, Messe SR, Mitchell PH, Selim M, Tamargo RJ, American Heart Association Stroke C, Council on Cardiovascular N. Guidelines for the management of spontaneous intracerebral hemorrhage: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke.* 2010;41:2108-2129.	819	136.5	2
8.	Kothari RU, Brott T, Broderick JP, Barsan WG, Sauerbeck LR, Zuccarello M, Khoury J. The ABCs of measuring intracerebral hemorrhage volumes. *Stroke.* 1996;27:1304-1305.	759	38.0	20
9.	Broderick JP, Adams HP, Jr., Barsan W, Feinberg W, Feldmann E, Grotta J, Kase C, Krieger D, Mayberg M, Tilley B, Zabramski JM, Zuccarello M. Guidelines for the management of spontaneous intracerebral hemorrhage: A statement for healthcare professionals from a special writing group of the Stroke Council, American Heart Association. *Stroke.* 1999;30:905-915.	676	39.8	18
10.	Hemphill JC, 3rd, Bonovich DC, Besmertis L, Manley GT, Johnston SC. The ICH score: a simple, reliable grading scale for intracerebral hemorrhage. *Stroke.* 2001;32:891-897.	661	44.1	16
11.	Mayer SA, Brun NC, Begtrup K, Broderick J, Davis S, Diringer MN, Skolnick BE, Steiner T, Investigators FT. Efficacy and safety of recombinant activated factor VII for acute intracerebral hemorrhage. *N Engl J Med.* 2008;358:2127-2137.	610	76.3	7
12.	Fazekas F, Kleinert R, Roob G, Kleinert G, Kapeller P, Schmidt R, Hartung HP. Histopathologic analysis of foci of signal loss on gradient-echo T2*-weighted MR images in patients with spontaneous intracerebral hemorrhage: evidence of microangiopathy-related microbleeds. *AJNR Am J Neuroradiol.* 1999;20:637-642.	590	34.7	22
13.	Broderick J, Connolly S, Feldmann E, Hanley D, Kase C, Krieger D, Mayberg M, Morgenstern L, Ogilvy CS, Vespa P, Zuccarello M, American Heart A, American Stroke Association Stroke C, High Blood Pressure Research C, Quality of C, Outcomes in Research Interdisciplinary Working G. Guidelines for the management of spontaneous intracerebral hemorrhage in adults: 2007 update: a guideline from the American Heart Association/American Stroke Association Stroke Council, High Blood Pressure Research Council, and the Quality of Care and Outcomes in Research Interdisciplinary Working Group. *Stroke.* 2007;38:2001-2023.	584	64.9	8

Continues

Supplementary Table 1. Continued

Rank	Article	Citations	Average Citations Per Year	Rank According to Average Citations Per Year
14.	Bamford J, Sandercock P, Dennis M, Burn J, Warlow C. A prospective study of acute cerebrovascular disease in the community: the Oxfordshire Community Stroke Project–1981-86. 2. Incidence, case fatality rates and overall outcome at one year of cerebral infarction, primary intracerebral and subarachnoid haemorrhage. *J Neurol Neurosurg Psychiatry.* 1990;53:16-22.	580	22.3	35
15.	Xi G, Keep RF, Hoff JT. Mechanisms of brain injury after intracerebral haemorrhage. *Lancet Neurol.* 2006;5:53-63.	559	55.9	12
16.	van Asch CJ, Luitse MJ, Rinkel GJ, van der Tweel I, Algra A, Klijn CJ. Incidence, case fatality, and functional outcome of intracerebral haemorrhage over time, according to age, sex, and ethnic origin: a systematic review and meta-analysis. *Lancet Neurol.* 2010;9:167-176.	465	77.5	6
17.	Davis SM, Broderick J, Hennerici M, Brun NC, Diringer MN, Mayer SA, Begtrup K, Steiner T, Recombinant Activated Factor VIIIHTI. Hematoma growth is a determinant of mortality and poor outcome after intracerebral hemorrhage. *Neurology.* 2006;66:1175-1181.	441	44.1	15
18.	Qureshi AI, Mendelow AD, Hanley DF. Intracerebral haemorrhage. *Lancet.* 2009;373:1632-1644.	417	59.6	10
19.	Anderson CS, Huang Y, Wang JG, Arima H, Neal B, Peng B, Heeley E, Skulina C, Parsons MW, Kim JS, Tao QL, Li YC, Jiang JD, Tai LW, Zhang JL, Xu E, Cheng Y, Heritier S, Morgenstern LB, Chalmers J, Investigators I. Intensive blood pressure reduction in acute cerebral haemorrhage trial (INTERACT): a randomised pilot trial. *Lancet Neurol.* 2008;7:391-399.	401	50.1	13
20.	Kidwell CS, Chalela JA, Saver JL, Starkman S, Hill MD, Demchuk AM, Butman JA, Patronas N, Alger JR, Latour LL, Luby ML, Baird AE, Leary MC, Tremwel M, Ovbiagele B, Fredieu A, Suzuki S, Villablanca JP, Davis S, Dunn B, Todd JW, Ezzeddine MA, Haymore J, Lynch JK, Davis L, Warach S. Comparison of MRI and CT for detection of acute intracerebral hemorrhage. *JAMA.* 2004;292:1823-1830.	377	31.4	23
21.	Auer LM, Deinsberger W, Niederkorn K, Gell G, Kleinert R, Schneider G, Holzer P, Bone G, Mokry M, Korner E, et al. Endoscopic surgery versus medical treatment for spontaneous intracerebral hematoma: a randomized study. *J Neurosurg.* 1989;70:530-535.	367	13.6	60
22.	Broderick JP, Brott T, Tomsick T, Miller R, Huster G. Intracerebral hemorrhage more than twice as common as subarachnoid hemorrhage. *J Neurosurg.* 1993;78:188-191.	365	15.9	52
23.	Kazui S, Naritomi H, Yamamoto H, Sawada T, Yamaguchi T. Enlargement of spontaneous intracerebral hemorrhage. Incidence and time course. *Stroke.* 1996;27:1783-1787.	351	17.6	46
24.	Schoenberg BS, Mellinger JF, Schoenberg DG. Cerebrovascular disease in infants and children: a study of incidence, clinical features, and survival. *Neurology.* 1978;28:763-768.	346	9.1	87
25.	Cordonnier C, Al-Shahi Salman R, Wardlaw J. Spontaneous brain microbleeds: systematic review, subgroup analyses and standards for study design and reporting. *Brain.* 2007;130:1988-2003.	345	38.3	19
26.	Ariesen MJ, Claus SP, Rinkel GJ, Algra A. Risk factors for intracerebral hemorrhage in the general population: a systematic review. *Stroke.* 2003;34:2060-2065.	329	25.3	30
27.	Greenberg SM, Eng JA, Ning M, Smith EE, Rosand J. Hemorrhage burden predicts recurrent intracerebral hemorrhage after lobar hemorrhage. *Stroke.* 2004;35:1415-1420.	326	27.2	28
28.	Anderson CS, Heeley E, Huang Y, Wang J, Stapf C, Delcourt C, Lindley R, Robinson T, Lavados P, Neal B, Hata J, Arima H, Parsons M, Li Y, Wang J, Heritier S, Li Q, Woodward M, Simes RJ, Davis SM, Chalmers J, Investigators I. Rapid blood-pressure lowering in patients with acute intracerebral hemorrhage. *N Engl J Med.* 2013;368:2355-2365.	316	105.3	3
29.	Vespa PM, O'Phelan K, Shah M, Mirabelli J, Starkman S, Kidwell C, Saver J, Nuwer MR, Frazee JG, McArthur DA, Martin NA. Acute seizures after intracerebral hemorrhage: a factor in progressive midline shift and outcome. *Neurology.* 2003;60:1441-1446.	308	23.7	33
30.	Diringer MN, Edwards DF. Admission to a neurologic/neurosurgical intensive care unit is associated with reduced mortality rate after intracerebral hemorrhage. *Crit Care Med.* 2001;29:635-640.	295	19.7	40
31.	Broderick JP, Brott T, Tomsick T, Huster G, Miller R. The risk of subarachnoid and intracerebral hemorrhages in blacks as compared with whites. *N Engl J Med.* 1992;326:733-736.	291	12.1	72

Continues

Supplementary Table 1. Continued

Rank	Article	Citations	Average Citations Per Year	Rank According to Average Citations Per Year
32.	Sacco RL, Wolf PA, Bharucha NE, Meeks SL, Kannel WB, Charette LJ, McNamara PM, Palmer EP, D'Agostino R. Subarachnoid and intracerebral hemorrhage: natural history, prognosis, and precursive factors in the Framingham Study. *Neurology.* 1984;34:847-854.	288	9.0	89
33.	Yang GY, Betz AL, Chenevert TL, Brunberg JA, Hoff JT. Experimental intracerebral hemorrhage: relationship between brain edema, blood flow, and blood-brain barrier permeability in rats. *J Neurosurg.* 1994;81:93-102.	281	12.8	67
34.	Woo D, Sauerbeck LR, Kissela BM, Khoury JC, Szaflarski JP, Gebel J, Shukla R, Pancioli AM, Jauch EC, Menon AG, Deka R, Carrozzella JA, Moomaw CJ, Fontaine RN, Broderick JP. Genetic and environmental risk factors for intracerebral hemorrhage: preliminary results of a population-based study. *Stroke.* 2002;33:1190-1195.	273	19.5	41
35.	Lee KR, Colon GP, Betz AL, Keep RF, Kim S, Hoff JT. Edema from intracerebral hemorrhage: the role of thrombin. *J Neurosurg.* 1996;84:91-96.	270	13.5	61
36.	European Stroke Initiative Writing C, Writing Committee for the EEC, Steiner T, Kaste M, Forsting M, Mendelow D, Kwiecinski H, Szikora I, Juvela S, Marchel A, Chapot R, Cognard C, Unterberg A, Hacke W. Recommendations for the management of intracranial haemorrhage - part I: spontaneous intracerebral haemorrhage. The European Stroke Initiative Writing Committee and the Writing Committee for the EUSI Executive Committee. *Cerebrovasc Dis.* 2006;22:294-316.	267	26.7	29
37.	Juvela S, Heiskanen O, Poranen A, Valtonen S, Kuurne T, Kaste M, Troupp H. The treatment of spontaneous intracerebral hemorrhage. A prospective randomized trial of surgical and conservative treatment. *J Neurosurg.* 1989;70:755-758.	265	9.8	85
38.	Huang FP, Xi G, Keep RF, Hua Y, Nemoianu A, Hoff JT. Brain edema after experimental intracerebral hemorrhage: role of hemoglobin degradation products. *J Neurosurg.* 2002;96:287-293.	265	18.9	44
39.	Daverat P, Castel JP, Dartigues JF, Orgogozo JM. Death and functional outcome after spontaneous intracerebral hemorrhage. A prospective study of 166 cases using multivariate analysis. *Stroke.* 1991;22:1-6.	262	10.5	81
40.	Wang J, Dore S. Inflammation after intracerebral hemorrhage. *J Cereb Blood Flow Metab.* 2007;27:894-908.	258	28.7	26
41.	Fiebach JB, Schellinger PD, Gass A, Kucinski T, Siebler M, Villringer A, Olkers P, Hirsch JG, Heiland S, Wilde P, Jansen O, Rother J, Hacke W, Sartor K, Kompetenznetzwerk Schlaganfall B. Stroke magnetic resonance imaging is accurate in hyperacute intracerebral hemorrhage: a multicenter study on the validity of stroke imaging. *Stroke.* 2004;35:502-506.	258	21.5	36
42.	Tuhrim S, Horowitz DR, Sacher M, Godbold JH. Volume of ventricular blood is an important determinant of outcome in supratentorial intracerebral hemorrhage. *Crit Care Med.* 1999;27:617-621.	257	15.1	54
43.	Wada R, Aviv RI, Fox AJ, Sahlas DJ, Gladstone DJ, Tomlinson G, Symons SP. CT angiography "spot sign" predicts hematoma expansion in acute intracerebral hemorrhage. *Stroke.* 2007;38:1257-1262.	257	28.6	27
44.	Lee KR, Kawai N, Kim S, Sagher O, Hoff JT. Mechanisms of edema formation after intracerebral hemorrhage: effects of thrombin on cerebral blood flow, blood-brain barrier permeability, and cell survival in a rat model. *J Neurosurg.* 1997;86:272-278.	255	13.4	63
45.	Zazulia AR, Diringer MN, Videen TO, Adams RE, Yundt K, Aiyagari V, Grubb RL, Jr., Powers WJ. Hypoperfusion without ischemia surrounding acute intracerebral hemorrhage. *J Cereb Blood Flow Metab.* 2001;21:804-810.	252	16.8	48
46.	Leira R, Davalos A, Silva Y, Gil-Peralta A, Tejada J, Garcia M, Castillo J, Stroke Project CDGotSNS. Early neurologic deterioration in intracerebral hemorrhage: predictors and associated factors. *Neurology.* 2004;63:461-467.	251	20.9	38
47.	Piepgras DG, Morgan MK, Sundt TM, Jr., Yanagihara T, Mussman LM. Intracerebral hemorrhage after carotid endarterectomy. *J Neurosurg.* 1988;68:532-536.	249	8.9	90
48.	Power C, Henry S, Del Bigio MR, Larsen PH, Corbett D, Imai Y, Yong VW, Peeling J. Intracerebral hemorrhage induces macrophage activation and matrix metalloproteinases. *Ann Neurol.* 2003;53:731-742.	248	19.1	42
49.	Powers WJ, Zazulia AR, Videen TO, Adams RE, Yundt KD, Aiyagari V, Grubb RL, Jr., Diringer MN. Autoregulation of cerebral blood flow surrounding acute (6 to 22 hours) intracerebral hemorrhage. *Neurology.* 2001;57:18-24.	245	16.3	49
50.	Becker KJ, Baxter AB, Cohen WA, Bybee HM, Tirschwell DL, Newell DW, Winn HR, Longstreth WT, Jr. Withdrawal of support in intracerebral hemorrhage may lead to self-fulfilling prophecies. *Neurology.* 2001;56:766-772.	245	16.3	50

Continues

Supplementary Table 1. Continued

Rank	Article	Citations	Average Citations Per Year	Rank According to Average Citations Per Year
51.	Gould DB, Phalan FC, van Mil SE, Sundberg JP, Vahedi K, Massin P, Bousser MG, Heutink P, Miner JH, Tournier-Lasserve E, John SW. Role of COL4A1 in small-vessel disease and hemorrhagic stroke. *N Engl J Med*. 2006;354:1489-1496.	241	24.1	32
52.	Zazulia AR, Diringer MN, Derdeyn CP, Powers WJ. Progression of mass effect after intracerebral hemorrhage. *Stroke*. 1999;30:1167-1173.	239	14.1	57
53.	Hua Y, Schallert T, Keep RF, Wu J, Hoff JT, Xi G. Behavioral tests after intracerebral hemorrhage in the rat. *Stroke*. 2002;33:2478-2484.	239	17.1	47
54.	Schellinger PD, Jansen O, Fiebach JB, Hacke W, Sartor K. A standardized MRI stroke protocol: comparison with CT in hyperacute intracerebral hemorrhage. *Stroke*. 1999;30:765-768.	239	14.1	58
55.	Wakai S, Yamakawa K, Manaka S, Takakura K. Spontaneous intracranial hemorrhage caused by brain tumor: its incidence and clinical significance. *Neurosurgery*. 1982;10:437-444.	238	7.0	97
56.	Werring DJ, Frazer DW, Coward LJ, Losseff NA, Watt H, Cipolotti L, Brown MM, Jager HR. Cognitive dysfunction in patients with cerebral microbleeds on T2*-weighted gradient-echo MRI. *Brain*. 2004;127:2265-2275.	237	19.8	39
57.	Broderick J, Talbot GT, Prenger E, Leach A, Brott T. Stroke in children within a major metropolitan area: the surprising importance of intracerebral hemorrhage. *J Child Neurol*. 1993;8:250-255.	235	10.2	83
58.	Lee ST, Chu K, Jung KH, Kim SJ, Kim DH, Kang KM, Hong NH, Kim JH, Ban JJ, Park HK, Kim SU, Park CG, Lee SK, Kim M, Roh JK. Anti-inflammatory mechanism of intravascular neural stem cell transplantation in haemorrhagic stroke. *Brain*. 2008;131:616-629.	233	29.1	25
59.	Yano K, Reed DM, MacLean CJ. Serum cholesterol and hemorrhagic stroke in the Honolulu Heart Program. *Stroke*. 1989;20:1460-1465.	233	8.6	92
60.	Kazui S, Minematsu K, Yamamoto H, Sawada T, Yamaguchi T. Predisposing factors to enlargement of spontaneous intracerebral hematoma. *Stroke*. 1997;28:2370-2375.	230	12.1	73
61.	Brott T, Thalinger K, Hertzberg V. Hypertension as a risk factor for spontaneous intracerebral hemorrhage. *Stroke*. 1986;17:1078-1083.	230	7.7	95
62.	Koennecke HC. Cerebral microbleeds on MRI: prevalence, associations, and potential clinical implications. *Neurology*. 2006;66:165-171.	229	22.9	34
63.	Tanaka A, Ueno Y, Nakayama Y, Takano K, Takebayashi S. Small chronic hemorrhages and ischemic lesions in association with spontaneous intracerebral hematomas. *Stroke*. 1999;30:1637-1642.	228	13.4	64
64.	Fujii Y, Takeuchi S, Sasaki O, Minakawa T, Tanaka R. Multivariate analysis of predictors of hematoma enlargement in spontaneous intracerebral hemorrhage. *Stroke*. 1998;29:1160-1166.	225	12.5	69
65.	Liu DZ, Tian Y, Ander BP, Xu H, Stamova BS, Zhan X, Turner RJ, Jickling G, Sharp FR. Brain and blood microRNA expression profiling of ischemic stroke, intracerebral hemorrhage, and kainate seizures. *J Cereb Blood Flow Metab*. 2010;30:92-101.	224	37.3	21
66.	Rosenberg GA, Navratil M. Metalloproteinase inhibition blocks edema in intracerebral hemorrhage in the rat. *Neurology*. 1997;48:921-926.	224	11.8	75
67.	Ohwaki K, Yano E, Nagashima H, Hirata M, Nakagomi T, Tamura A. Blood pressure management in acute intracerebral hemorrhage: relationship between elevated blood pressure and hematoma enlargement. *Stroke*. 2004;35:1364-1367.	222	18.5	45
68.	Xi G, Wagner KR, Keep RF, Hua Y, de Courten-Myers GM, Broderick JP, Brott TG, Hoff JT. Role of blood clot formation on early edema development after experimental intracerebral hemorrhage. *Stroke*. 1998;29:2580-2586.	221	12.3	71
69.	Wagner KR, Xi G, Hua Y, Kleinholz M, de Courten-Myers GM, Myers RE, Broderick JP, Brott TG. Lobar intracerebral hemorrhage model in pigs: rapid edema development in perihematomal white matter. *Stroke*. 1996;27:490-497.	221	11.1	78
70.	Fujii Y, Tanaka R, Takeuchi S, Koike T, Minakawa T, Sasaki O. Hematoma enlargement in spontaneous intracerebral hemorrhage. *J Neurosurg*. 1994;80:51-57.	220	10.0	84

Continues

Supplementary Table 1. Continued

Rank	Article	Citations	Average Citations Per Year	Rank According to Average Citations Per Year
71.	Broderick J, Connolly S, Feldmann E, Hanley D, Kase C, Krieger D, Mayberg M, Morgenstern L, Ogilvy CS, Vespa P, Zuccarello M, American Heart Association/American Stroke Association Stroke C, American Heart Association/American Stroke Association High Blood Pressure Research C, Quality of C, Outcomes in Research Interdisciplinary Working G. Guidelines for the management of spontaneous intracerebral hemorrhage in adults: 2007 update: a guideline from the American Heart Association/American Stroke Association Stroke Council, High Blood Pressure Research Council, and the Quality of Care and Outcomes in Research Interdisciplinary Working Group. *Circulation*. 2007;116:e391-413.	219	24.3	31
72.	Mckissock W, Richardson A, Taylor J. Primary intracerebral haemorrhage: a controlled trial of surgical and conservative treatment in 180 unselected cases. *Lancet*. 1961;278:221-226.	219	4.0	100
73.	Poungvarin N, Bhoopat W, Viriyavejakul A, Rodprasert P, Buranasiri P, Sukondhabhant S, Hensley MJ, Strom BL. Effects of dexamethasone in primary supratentorial intracerebral hemorrhage. *N Engl J Med*. 1987;316:1229-1233.	216	7.4	96
74.	Xi G, Keep RF, Hoff JT. Erythrocytes and delayed brain edema formation following intracerebral hemorrhage in rats. *J Neurosurg*. 1998;89:991-6.	215	11.9	74
75.	Linfante I, Llinas RH, Caplan LR, Warach S. MRI features of intracerebral hemorrhage within 2 hours from symptom onset. *Stroke*. 1999;30:2263-2267.	213	12.5	68
76.	Gong C, Hoff JT, Keep RF. Acute inflammatory reaction following experimental intracerebral hemorrhage in rat. *Brain Res*. 2000;871:57-65.	210	13.1	65
77.	Wu J, Hua Y, Keep RF, Nakamura T, Hoff JT, Xi G. Iron and iron-handling proteins in the brain after intracerebral hemorrhage. *Stroke*. 2003;34:2964-2969.	209	16.1	51
78.	Morgenstern LB, Frankowski RF, Shedden P, Pasteur W, Grotta JC. Surgical treatment for intracerebral hemorrhage (STICH): a single-center, randomized clinical trial. *Neurology*. 1998;51:1359-1363.	204	11.3	77
79.	Lisk DR, Pasteur W, Rhoades H, Putnam RD, Grotta JC. Early presentation of hemispheric intracerebral hemorrhage: prediction of outcome and guidelines for treatment allocation. *Neurology*. 1994;44:133-139.	199	9.0	88
80.	Gebel JM, Jr., Jauch EC, Brott TG, Khoury J, Sauerbeck L, Salisbury S, Spilker J, Tomsick TA, Duldner J, Broderick JP. Relative edema volume is a predictor of outcome in patients with hyperacute spontaneous intracerebral hemorrhage. *Stroke*. 2002;33:2636-2641.	198	14.1	56
81.	Schwarz S, Hafner K, Aschoff A, Schwab S. Incidence and prognostic significance of fever following intracerebral hemorrhage. *Neurology*. 2000;54:354-361.	197	12.3	70
82.	Zuccarello M, Brott T, Derex L, Kothari R, Sauerbeck L, Tew J, Van Loveren H, Yeh HS, Tomsick T, Pancioli A, Khoury J, Broderick J. Early surgical treatment for supratentorial intracerebral hemorrhage: a randomized feasibility study. *Stroke*. 1999;30:1833-1839.	196	11.5	76
83.	Del Bigio MR, Yan HJ, Buist R, Peeling J. Experimental intracerebral hemorrhage in rats. Magnetic resonance imaging and histopathological correlates. *Stroke*. 1996;27:2312-2319 [discussion 2319-2320].	194	9.7	86
84.	Diringer MN, Edwards DF, Zazulia AR. Hydrocephalus: a previously unrecognized predictor of poor outcome from supratentorial intracerebral hemorrhage. *Stroke*. 1998;29:1352-1357.	192	10.7	80
85.	Claassen J, Jette N, Chum F, Green R, Schmidt M, Choi H, Jirsch J, Frontera JA, Connolly ES, Emerson RG, Mayer SA, Hirsch LJ. Electrographic seizures and periodic discharges after intracerebral hemorrhage. *Neurology*. 2007;69:1356-1365.	191	21.2	37
86.	Flaherty ML, Haverbusch M, Sekar P, Kissela B, Kleindorfer D, Moomaw CJ, Sauerbeck L, Schneider A, Broderick JP, Woo D. Long-term mortality after intracerebral hemorrhage. *Neurology*. 2006;66:1182-1186.	190	19.0	43
87.	Jeerakathil T, Wolf PA, Beiser A, Hald JK, Au R, Kase CS, Massaro JM, DeCarli C. Cerebral microbleeds: prevalence and associations with cardiovascular risk factors in the Framingham Study. *Stroke*. 2004;35:1831-1835.	189	15.8	53
88.	Eckman MH, Rosand J, Knudsen KA, Singer DE, Greenberg SM. Can patients be anticoagulated after intracerebral hemorrhage? A decision analysis. *Stroke*. 2003;34:1710-1716.	188	14.5	55
89.	Mayer SA, Lignelli A, Fink ME, Kessler DB, Thomas CE, Swarup R, Van Heertum RL. Perilesional blood flow and edema formation in acute intracerebral hemorrhage: a SPECT study. *Stroke*. 1998;29:1791-1798.	188	10.4	82

Continues

Supplementary Table 1. Continued

Rank	Article	Citations	Average Citations Per Year	Rank According to Average Citations Per Year
90.	Mendelow AD, Gregson BA, Rowan EN, Murray GD, Gholkar A, Mitchell PM; for the STICH II Investigators. Early surgery versus initial conservative treatment in patients with spontaneous supratentorial lobar intracerebral haematomas (STICH II): a randomised trial. *Lancet*. 2013;382:397-408.	187	62.3	9
91.	Mayer SA, Sacco RL, Shi T, Mohr JP. Neurologic deterioration in noncomatose patients with supratentorial intracerebral hemorrhage. *Neurology*. 1994;44:1379-1384.	184	8.4	93
92.	Castillo J, Davalos A, Alvarez-Sabin J, Pumar JM, Leira R, Silva Y, Montaner J, Kase CS. Molecular signatures of brain injury after intracerebral hemorrhage. *Neurology*. 2002;58:624-629.	182	13.0	66
93.	Tuhrim S, Dambrosia JM, Price TR, Mohr JP, Wolf PA, Heyman A, Kase CS. Prediction of intracerebral hemorrhage survival. *Ann Neurol*. 1988;24:258-263.	179	6.4	99
94.	Teernstra OP, Evers SM, Lodder J, Leffers P, Franke CL, Blaauw G, Multicenter Randomized Controlled Trial. Stereotactic treatment of intracerebral hematoma by means of a plasminogen activator: a multicenter randomized controlled trial (SICHPA). *Stroke*. 2003;34:968-974.	179	13.8	59
95.	Offenbacher H, Fazekas F, Schmidt R, Koch M, Fazekas G, Kapeller P. MR of cerebral abnormalities concomitant with primary intracerebral hematomas. *AJNR Am J Neuroradiol*. 1996;17:573-578.	177	8.9	91
96.	Roob G, Lechner A, Schmidt R, Flooh E, Hartung HP, Fazekas F. Frequency and location of microbleeds in patients with primary intracerebral hemorrhage. *Stroke*. 2000;31:2665-2669.	176	11.0	79
97.	Poels MM, Vernooij MW, Ikram MA, Hofman A, Krestin GP, van der Lugt A, Breteler MM. Prevalence and risk factors of cerebral microbleeds: an update of the Rotterdam scan study. *Stroke*. 2010;41:S103-106.	176	29.3	24
98.	Broderick JP, Brott TG, Tomsick T, Barsan W, Spilker J. Ultra-early evaluation of intracerebral hemorrhage. *J Neurosurg*. 1990;72:195-199.	175	6.7	98
99.	Fan YH, Zhang L, Lam WW, Mok VC, Wong KS. Cerebral microbleeds as a risk factor for subsequent intracerebral hemorrhages among patients with acute ischemic stroke. Stroke. 2003;34:2459-2462.	175	13.5	62
100.	Dandapani BK, Suzuki S, Kelley RE, Reyes-Iglesias Y, Duncan RC. Relation between blood pressure and outcome in intracerebral hemorrhage. *Stroke*. 1995;26:21-24.	174	8.3	94