CASE SERIES

Burr-hole Drainage and Subdural Irrigation for Chronic Subdural Hematoma: Case Series and Data Report

Abhijeet Acharya[1], Anil Sahoo[2], SP Singh[3], Lulup Sahoo[4]

Received on: 11 April 2024; *Accepted on:* 06 May 2024; *Published on:* 26 February 2025

Abstract

One of the most prevalent forms of traumatic and spontaneous intracranial hematomas is still chronic subdural hematoma (CSDH). The best course of treatment has not yet been determined. Craniotomy, trephination, twist drill perforation with hematoma evacuation, and burr hole drainage with or without irrigation are surgical treatment options. The purpose of this case series study was to determine the effectiveness and importance of subdural irrigation in patients with CSDH.

Keywords: Case series, Burr-hole drainage, Chronic subdural hematoma, Craniectomy, Subdural irrigation.

Archives of CraniOrofacial Sciences (2024): 10.5005/acofs-11029-0002

Overview

Chronic subdural hematoma (CSDH) is quite a common neurosurgical emergency which requires emergency surgical intervention in the neurological setup. For removal of CSDH, a burr-hole craniectomy is a standard treatment protocol, followed by dural opening and irrigation of subdural hematoma.[1–9] The subdural area must be irrigated nicely. After this step drain should apply at subdural region. As in common practice, the use of the subdural drain is common and beneficial but use of this drain hides the significance of only subdural irrigation. In various studies, including our case series study, burr-hole drainage including drains with or without subdural irrigation presented similar outcomes in view of neurological outcome, functional outcome, rate of re-exploration, morbidity, or mortality. We conducted this case series study to find out the efficacy and significance of necessity of the subdural irrigation in patients with CSDH.[10–16]

Data and Study Model

The data was collected and included from three different hospitals in India over a period of 5 years (2013–2017).

We included an age-group over 17 years of age. All patients completed CT brain and criteria for burr-hole craniectomy and CSDH evacuation as per international standards.

We used a randomized control trial for the selection of patients under two categories:

(1) Burr-hole drainage with drain application with subdural irrigation.
(2) Burr-hole drainage with drain application without subdural irrigation.

In the operative procedure, standard burr-hole craniectomy is done at the thickest site of CSDH. In group A patients, after dural opening, with subdural irrigation, subdural drain was kept for 2–3 days. In group B patients, after dural opening, the subdural drain tube was kept for 2–3 days. Every 2nd-month follow-up scheduled for 1-year duration was also completed including a number of re-exploration surgery cases, neurological functional outcome, morbidity, and mortality among study patients.[17–21]

[1,3]Department of Neurosurgery, Institute of Medical Sciences (IMS) and SUM Hospital, Siksha 'O' Anusandhan (SOA) University, Bhubaneswar, Odisha, India

[2,4]Department of Neurology, Institute of Medical Sciences (IMS) and SUM Hospital, Siksha 'O' Anusandhan (SOA) University, Bhubaneswar, Odisha, India

Corresponding Author: SP Singh, Department of Neurosurgery, Institute of Medical Sciences (IMS) and SUM Hospital, Siksha 'O' Anusandhan (SOA) University, Bhubaneswar, Odisha, India, Phone: +91 8637230664, e-mail: drspst10@gmail.com

How to cite this article: Acharya A, Sahoo A, Singh SP, *et al*. Burr-hole Drainage and Subdural Irrigation for Chronic Subdural Hematoma: Case Series and Data Report. Arch Craniofac Sci 2024;7(1):11–13.

Source of support: Nil

Conflict of interest: None

Patient consent statement: The author(s) have obtained written informed consent from the patients (for all cases) and the patient's parents (for all data) for publication of the case report details and related images.

Data Analysis

Our case series study included a total of 112 patients in a period of January 1, 2013 to December 31, 2017.

Out of these 112 patients, 56 (50%) were randomly allocated under group A and 56 (50%) were allocated under group B. In group A patients, after dural opening, with subdural irrigation, the subdural drain was kept for 2–3 days. In group B patients, after dural opening, the subdural drain was kept for 2–3 days.[22–25]

Every month follow-up is completed for 1 year from the day of surgery. After this 6th month follow-up completed for the next 4 years. From group A, 11 patients (19.6%) and from group B, 13 patients (23.2%) redeveloped CSDH and re-admitted for re-exploration with the evacuation of CSDH, which is quite similar.[26]

The morbidity and mortality rate was 2–3% in both groups, which was also similar. Neurological outcome was better in

short-term follow-up (1–6 months) in group A patients and in long-term follow-up (1–5 years), both groups presented similar outcomes. About 4–5% of patients developed other complications, such as wound infection, systemic infection, intracranial bleeding, hemorrhage, and seizures. These complications were less common in group A and a little higher in group B similar in numbers across the study groups.

Conclusions

With the result of this case series study, the efficacy and significance of necessity of the subdural irrigation in patients of chronic subdural hematoma (CSDH) is established. Re-bleed/re-exploration or revision of surgery is required less in group A where CSDH irrigation is done.[27–29]

Also, the chances of complications like seizures, Cerebral vascular accident (CVA), etc. also marked less in group A patients.

Short-term neurological improvement was also recognized in those patients who belong to group A where CSDH irrigation was done after burr-hole surgery with drain application. Overall, the case series supports subdural irrigation after Burr holes in CSDH patients because the total outcome is better than without subdural irrigation.

References

1. Balser D, Farooq S, Mehmood T, et al. Actual and projected incidence rates for chronic subdural hematomas in United States Veterans Administration and civilian populations. J Neurosurg 2015;123(5):1209–1215. DOI: 10.3171/2014.9.JNS141550.
2. Tommiska P, Luostarinen T, Kaprio J, et al. Incidence of surgery for chronic subdural hematoma in Finland during 1997–2014: A nationwide study. J Neurosurg 2021;136(4):1186–1193. DOI: 10.3171/2021.3.JNS21281.
3. Rauhala M, Luoto TM, Huhtala H, et al. The incidence of chronic subdural hematomas from 1990 to 2015 in a defined Finnish population. J Neurosurg 2019;132(4):1147–1157. DOI: 10.3171/2018.12.JNS183035.
4. Gaist D, Halle B, Hallas J, et al. Association of antithrombotic drug use with subdural hematoma risk. JAMA 2017;317(8):836–846. DOI: 10.1001/jama.2017.0639.
5. Edlmann E, Giorgi-Coll S, Whitfield PC, et al. Pathophysiology of chronic subdural haematoma: Inflammation, angiogenesis and implications for pharmacotherapy. J Neuroinflammation 2017;14(1):108. DOI: 10.1186/s12974-017-0881-y.
6. Miah IP, Holl DC, Blaauw J, et al. DECSA Collaborators. Dexamethasone versus surgery for chronic subdural hematoma. N Engl J Med 2023;388(24):2230–2240. DOI: 10.1056/NEJMoa2216767.
7. Santarius T, Lawton R, Kirkpatrick PJ, et al. The management of primary chronic subdural haematoma: A questionnaire survey of practice in the United Kingdom and the Republic of Ireland. Br J Neurosurg 2008;22(4):529–534. DOI: 10.1080/02688690802195381.
8. Cenic A, Bhandari M, Reddy K. Management of chronic subdural hematoma: A national survey and literature review. Can J Neurol Sci 2005;32(4):501–506. DOI: 10.1017/s0317167100004510.
9. Horrax G, Poppen JL. The frequency, recognition and treatment of chronic subdural hematomas. N Engl J Med 1937;216: 381–385. DOI: 10.1056/NEJM193703042160904.
10. Weigel R, Krauss JK, Schmiedek P. Outcome of contemporary surgery for chronic subdural haematoma: Evidence based review. J NeurolNeurosurg Psychiatry 2003;74(7):937–943. DOI: 10.1136/jnnp.74.7.937.
11. Santarius T, Kirkpatrick PJ, Ganesan D, et al. Use of drains versus no drains after burr-hole evacuation of chronic subdural haematoma: A randomised controlled trial. Lancet 2009;374(9695):1067–1073. DOI: 10.1016/S0140-6736(09)61115-6.
12. Kolias AG, Chari A, Santarius T, et al. Chronic subdural haematoma: Modern management and emerging therapies. Nat Rev Neurol 2014;10(10):570–578. DOI: 10.1038/nrneurol.2014.163.
13. Bartley A, Bartek J Jr, Jakola AS, et al. Effect of irrigation fluid temperature on recurrence in the evacuation of chronic subdural hematoma: A randomized clinical trial. JAMA Neurol 2023;80(1):58–63. DOI: 10.1001/jamaneurol.2022.4133.
14. Mori K, Maeda M. Surgical treatment of chronic subdural hematoma in 500 consecutive cases: Clinical characteristics, surgical outcome, complications, and recurrence rate. Neurol Med Chir (Tokyo) 2001;41(8):371–381. DOI: 10.2176/nmc.41.371.
15. Seung WB, Jeong JH. Postoperative subarachnoid hemorrhage and multipunctate intracerebral hemorrhages following evacuation of bilateral chronic subdural hematomas. Korean J Neurotrauma 2017;13(2):149–152. DOI: 10.13004/kjnt.2017.13.2.149.
16. Kim DH, Kim HS, Choi HJ, et al. Recurrence of the chronic subdural hematoma after Burr-hole drainage with or without intraoperative saline irrigation. Korean J Neurotrauma 2014;10(2):101–105. DOI: 10.13004/kjnt.2014.10.2.101.
17. You CG, Zheng XS. Postoperative pneumocephalus increases the recurrence rate of chronic subdural hematoma. Clin Neurol Neurosurg 2018;166:56–60. DOI: 10.1016/j.clineuro.2018.01.029.
18. Tommiska P, Raj R, Schwartz C, et al. Finnish study of intraoperative irrigation versus drain alone after evacuation of chronic subdural haematoma (FINISH): A study protocol for a multicentre randomised controlled trial. BMJ Open 2020;10(6):e038275. DOI: 10.1136/bmjopen-2020-038275.
19. Statistics Finland, Concepts and definitions. Date accessed: May 21, 2024.
20. Duerinck J, Van Der Veken J, Schuind S, et al. Randomized trial comparing burr hole craniostomy, minicraniotomy, and twist drill craniostomy for treatment of chronic subdural hematoma. Neurosurgery 2022;91(2):304–311. DOI: 10.1227/neu.0000000000001997.
21. Schucht P, Fischer U, Fung C, et al. Follow-up computed tomography after evacuation of chronic subdural hematoma. N Engl J Med 2019;380(12):1186–1187. DOI: 10.1056/NEJMc1812507.
22. Soleman J, Lutz K, Schaedelin S, et al. Subperiosteal vs subdural drain after burr-hole drainage of chronic subdural hematoma: A randomized clinical trial (cSDH-Drain-Trial). Neurosurgery 2019;85(5):E825–E834. DOI: 10.1093/neuros/nyz095.
23. Järvinen TL, Sihvonen R, Bhandari M, et al. Blinded interpretation of study results can feasibly and effectively diminish interpretation bias. J Clin Epidemiol 2014;67(7):769–772. DOI: 10.1016/j.jclinepi.2013.11.011.
24. Peng D, Zhu Y. External drains versus no drains after burr-hole evacuation for the treatment of chronic subdural haematoma in adults. Cochrane Database Syst Rev 2016;2016(8):CD011402. DOI: 10.1002/14651858.CD011402.pub2.
25. Committee for Proprietary Medicinal Products. Points to consider on switching between superiority and non-inferiority. Br J Clin Pharmacol 2001;52(3):223–228. DOI: 10.1046/j.0306-5251.2001.01397-3.x.
26. Piaggio G, Elbourne DR, Pocock SJ, et al. CONSORT Group. Reporting of noninferiority and equivalence randomized trials: Extension of the CONSORT 2010 statement. JAMA 2012;308(24):2594–2604. DOI: 10.1001/jama.2012.87802.
27. Yuan Y, Wang QP, Cao YL, et al. Burr hole drainage and burr hole drainage with irrigation to treat chronic subdural hematoma: A systematic review and meta-analysis. Medicine (Baltimore) 2018;97(33):e11827. DOI: 10.1097/MD.0000000000011827.

28. Hutchinson PJ, Edlmann E, Bulters D, et al. British neurosurgical trainee research collaborative; Dex-CSDH trial collaborators. Trial of dexamethasone for chronic subdural hematoma. N Engl J Med 2020;383(27):2616–2627. DOI: 10.1056/NEJMoa2020473.

29. Jensen TSR, Haldrup M, Hjortdal Grønhøj M, et al. National randomized clinical trial on subdural drainage time after chronic subdural hematoma evacuation. J Neurosurg 2021;137(3):799–806. DOI: 10.3171/2021.10.JNS211608.