Original Research Article

Factors Deciding Outcome of Chronic Subdural Hematoma

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Received: 01-10-2021 / Revised: 14-11-2021 / Accepted: 29-12-2021

Abstract

Background: C.S.D.H is a common condition in neurosurgical practise found widely in elderly people. Recurrence following surgical decompression is not uncommon and depends on mode of surgery. **Objective:** To identify the best mode of treatment in view of recurrence prevention. **Methods:** Cases of C.S.D.H operated at our hospital between 2018 - 2020 were reviewed prospectively. Data included preoperative and postoperative symptoms, type of surgical treatment, use of surgical drain and clinical outcome. **Results:** A total of 240 cases were analysed. And overall recurrence was 9.5 %. The risk of recurrence was higher in patients who undergone surgery without drain application, twist drill aspiration of hematoma and septate CSDH operated with burr hole craniotomy. **Conclusion:** Burr hole craniostomy with drain had lower recurrence rate in comparison to twist drill aspiration. Septate SDH may need craniotomy to prevent recurrence.

Keywords: CSDH, Craniostomy, Twist Drill.

Introduction

Chronic Subdural Hematoma is mainly found in elderly population. It has a positive correlation with increasing age and the brain atrophy. It is due to rupture of bridging veins between the tabula interna of the skull and the surface of the brain. As the veins are stretched thus more prone to rupture caused by even a trivial trauma.

Gradual accumulation of blood between duramater and arachnoid occurring over a period of two weeks or more causes CSDH. It appears iso or hypo dense on CT imaging and may present with hemiplegia, seizures, altered mental status, headache, vomiting and papilledema.

MRI brain is needed to assess septate CSDH. The principal techniques used in the treatment of CSDH are twist drill craniostomy, burr hole craniostomy with or without drain and craniotomy.

The aim of this study is to compare between different treatment modalities in view of recurrence prevention.

Methods

This is a retrospective study between March2018 to February2020. Cases of CSDH operated at PMCH Patna and other nearby hospitals during this are included in this study. Surgery was performed as early as possible. Surgical technique we have chosen according to radiological findings and surgeon's preference. Techniques were categorised as single parietal burr hole craniostomy, with or without drain, twist drill craniostomy and craniotomy. Outcome was categorised as cured morbidity, mortality and recurrence. Morbidity was defined as any complication during and after surgery except recurrence. Recurrence was defined by clinical and radiological findings.

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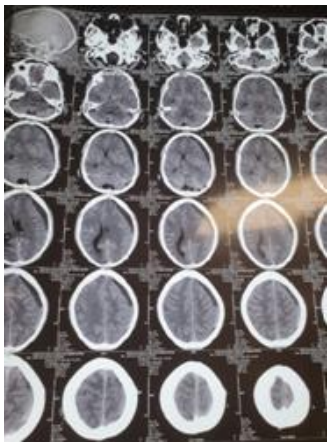

Fig 1: A case of CSDH

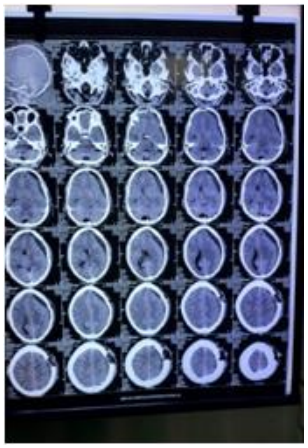

Fig 2: Recurrence after surgery

Results

A total of 240 patients with CSDH were studied. The mean age of the patient population was 65. The most common presentation was hemiparesis (60%) followed by headaches (50%) and aphasia (20%). A history of head injury was reported in 40% of the patients. Out of 240 patients only 10% underwent twist drill craniostomy. Burr hole craniostomy was done in 60% cases while craniotomy was performed in 20% of the cases. Out of 144 cases who underwent burr hoe craniostomy drain was applied in 120 (83%) cases. Overall recurrence rate was 10%. Recurrence rate was higher in patients who underwent surgery without drain (15%). Also, patients who underwent twist drill craniostomy showed higher recurrence rate (30%).

Table 1: Types of surgery performed

Types of surgery performed	Number of patients	Percentage
TDC	24	10%
BHC with drain	120	50%
BHC without drain	24	10%
Craniotomy	72	30%

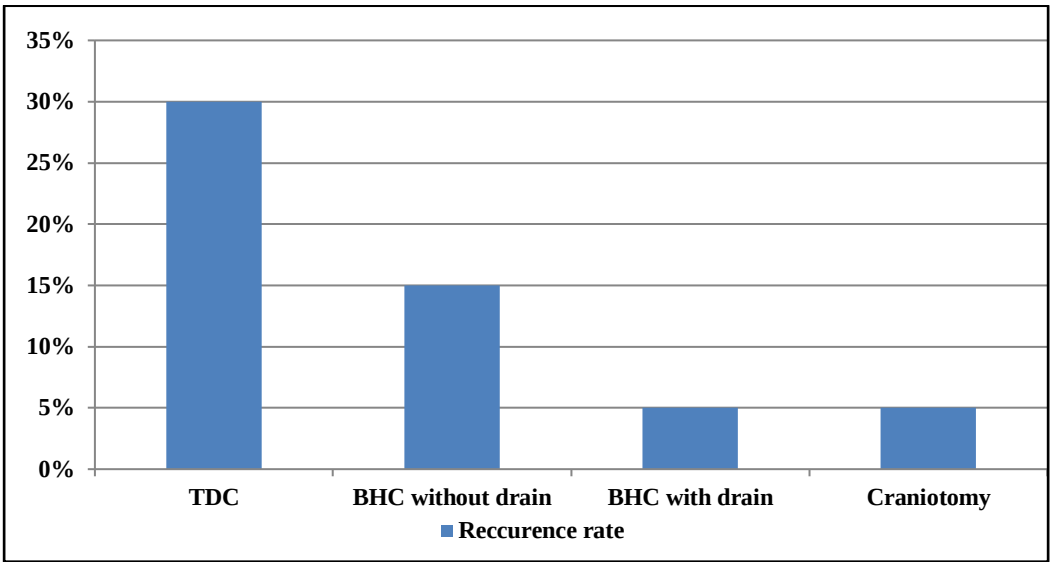

Fig 3: Recurrence rate with types of procedures performed

Discussion

The extent of surgery necessary for adequate treatment of chronic subdural haematoma is still a matter of debate. Burr hole craniostomy seems to have been the most commonly performed procedure for decompressing chronic subdural haematomas. Morbidity and mortality rates of burr hole craniostomy are comparable with those of twist drill craniostomy, while the recurrence rates are similar to those achieved with craniotomy. Craniotomy is still the surgical approach with the least risk of recurrence. Surgical management influenced risk of recurrence, with patients receiving burr-hole craniostomy having the lowest recurrence rate, followed by patients undergoing a wider craniotomy. Placement of a surgical drain was associated with a significantly reduced risk of recurrence. Whether age and sex have an influence on the rates of recurrence after surgery for CSDH evacuation is debated, with some reports suggesting older age and male sex to be at higher risk[1] and others with opposite findings[2]. Type of surgical evacuation for CSDHs has been a matter of debate. Though bedside twist-drill craniostomy has been successfully employed[3], a single or double burr-hole craniotomy under local or general anesthesia is usually the procedure of choice. Extended craniectomy or craniotomy that allow for resection of the capsule or membrane of the hematoma have been shown neither to provide advantages in lowering recurrence rates nor to improve the neurological outcome[4]. In this series the procedure of choice was single burr-hole craniostomy. It has been reported that a double burr-hole does not provide a significant clinical advantage and leads to higher rates of recurrence[5,6]. The rates of recurrence presented in our series suggest that the less invasive choice of a single burr-hole is adequate for obtaining satisfactory clinical outcomes. Many studies demonstrated that an important modifiable risk factor for CSDH recurrence is postoperative drainage. Drain placement has been associated with lower recurrence (3.1–10.5% with drain vs. 17–33% without)[7-11]. A randomized controlled trial (RCT) reported a reduction of recurrence rates from 24 to 9.3% and no additional complication with the use of a subdural drain[12]; the trial was even stopped early because of the clear results. An Indian prospective randomized trial showed similar complications and mortality, but fewer recurrences with drain placement (26 vs. 9%)[13]. Other study groups and meta-analyses reached the same conclusions[14-18]. An Indian RCT reported a lower rate of recurrence with a single burr-hole with drain placement vs. two burr-holes (1.4 vs. 15.7%)[19]. The present study corroborates such literature, providing yet clearer evidence to support the use of postoperative drainage in all cases of surgical evacuation of CSDH. The position of the drain (subdural vs. subperiosteal) does not appear to modify the outcome[12]. Some authors suggested that a subperiosteal drainage could help reduce seizures and infection, avoiding direct contact with the hematoma membranes; in their study re-intervention rate for recurrence was 9.3% with drain placement[5]. Although a drain in the subdural space would be the most intuitive solution to allow for complete evacuation of the hematoma, it is arguable that, once a communication between the subdural and subperiosteal spaces is made through a craniostomy, both spaces are suitable for drain placement. Indeed, a recently published RCT demonstrates the noninferiority of subperiosteal placement in terms of recurrence rates, in the setting of reduced complication rates[20]. It has been stated that, when placing a subdural drain, it should not be inserted for more than approximately 4 cm[21]. The duration of drainage may matter, but evidence is lacking; a Chinese study reported 6.6% recurrence with drain placement, ranging from 16.3% with drain removal prior to 3 days to

1.3% if removed thereafter[20]. However, these results must be interpreted cautiously, as they were obtained retrospectively and timing of removal was decided on an individual non-randomized basis. The present study suggests that 48 h of postoperative drainage is adequate to provide satisfactory outcomes, without significant complications.

Conclusion

In conclusion burr-hole craniostomy was found to be associated with the lowest recurrence rate, when compared to other surgical procedures. Placement of surgical drain was significantly associated with reduced risk of recurrence of CSDHs.

Acknowledgements

This article was possible due to all the patients for cooperation, my seniors for guiding me and Aaditya Vatsa for giving us technical support.

References

1. Miah IP, Holl DC, Peul WC, Walchenbach R, Kruyt N, de Laat K, et al. Dexamethasone therapy versus surgery for chronic subdural haematoma (DECSA trial): study protocol for a randomised controlled trial. Trials. (2018) 19:1–10. doi: 10.1186/s13063-018-2945-4
2. Bartek J, Sjåvik K, Kristiansson H, Ståhl F, Fornebo I, Förander P, et al. Predictors of recurrence and complications after chronic subdural hematoma surgery: a population-based study. World Neurosurg. (2017) 106:609– 14. doi: 10.1016/j.wneu.2017.07.044
3. Soleman J, Lutz K, Schaedelin S, Kamenova M, Guzman R, Mariani L, et al. Subperiosteal vs subdural drain after burr-hole drainage of chronic subdural hematoma: a randomized clinical trial (cSDH-Drain-Trial). Neurosurgery. (2019) 85:E825–34. doi: 10.1093/neuros/nyz095
4. Lee JY, Ebel H, Ernestus RI, Klug N. Various surgical treatments of chronic subdural hematoma and outcome in 172 patients: is membranectomy necessary? Surg Neurol. (2004) 61:523–7. doi: 10.1016/j.surneu.2003.10.026
5. Kutty SA, Johny M. Chronic subdural hematoma: a comparison of recurrence rates following burr-hole craniostomy with and without drains. Turk Neurosurg. (2014) 24:494–7.
6. Smith MD, Kishikova L, Norris JM. Surgical management of chronic subdural haematoma: one hole or two? Int J Surg. (2012) 10:450– 2. doi: 10.1016/j.ijsu.2012.08.005
7. Gazzeri R, Galarza M, Neroni M, Canova A, Refice GM, Esposito S. Continuous subgaleal suction drainage for the treatment of chronic subdural haematoma. Acta Neurochir. (2007) 149:487– 93. doi: 10.1007/s00701-007-1139-8
8. Edlmann E, Giorgi-Coll S, Whitfield PC, Carpenter KLH, Hutchinson PJ. Pathophysiology of chronic subdural haematoma: inflammation, angiogenesis and implications for pharmacotherapy. J Neuroinflammation. (2017) 14:108Gurelik M, Aslan A, Gurelik B, Ozum U, Karadag O, Kars HZ. A safe and effective method for treatment of chronic subdural haematoma. Can J Neurol Sci. (2007) 34:84–7 Tsutsumi K, Maeda K, Iijima A, Usui M, Okada Y, Kirino T. The relationship of preoperative magnetic resonance imaging findings and closed system drainage in the recurrence of chronic subdural hematoma. J Neurosurg. (1997) 87:870–5.
9. Wakai S, Hashimoto K, Watanabe N, Inoh S, Ochiai C, Nagai M. Efficacy of closed-system drainage in treating chronic subdural hematoma: a prospective comparative study. Neurosurgery. (1990) 26:771–3.
10. Santarius T, Hutchinson PJ. Chronic subdural haematoma: time to rationalise treatment? Br J Neurosurg. (2004) 18:328– 32. doi: 10.1080/02688690400004845
11. Singh AK, Suryanarayanan B, Choudhary A, Prasad A, Singh S, Gupta LN. A prospective randomized study of use of drain versus no drain after burr-hole evacuation of chronic subdural hematoma. Neurol India. (2014) 62:169–74.
12. Alcalá-Cerra G, Young AMH, Moscote-Salazar LR, PaterninaCaicedo Á. Efficacy and safety of subdural drains after burr-hole evacuation of chronic subdural hematomas: systematic review and meta-analysis of randomized controlled trials. World Neurosurg. (2014) 82:1148-57.
13. Edlmann E, Holl DC, Lingsma HF, Bartek J Jr, Bartley A, Duerinck J, et al. Systematic review of current randomised control trials in chronic subdural haematoma and proposal for an international collaborative approach. Acta Neurochir. (2020) 162:763–76. doi: 10.1007/s00701-020-04218-8
14. Guilfoyle MR, Hutchinson PJA, Santarius T. Improved long-term survival with subdural drains following evacuation of chronic subdural haematoma. Acta Neurochir. (2017) 159:903–5. doi: 10.1007/s00701-017-3095-2
15. Liu W, Bakker NA, Groen RJM. Chronic subdural hematoma: a systematic review and meta-analysis of surgical procedures. J Neurosurg. (2014) 121:665– 73. doi: 10.3171/2014.5.JNS132715
16. Ramachandran R, Hegde T. Chronic subdural hematomas–causes of morbidity and mortality. Surg Neurol. (2007) 67:363–7. doi: 10.1016/j.surneu.2006. 07.022
17. Glancz LJ, Poon MTC, Coulter IC, Hutchinson PJ, Kolias AG, Brennan PM. Does drain position and duration influence outcomes in patients undergoing burr-hole evacuation of chronic subdural hematoma? Lessons from a UK Multicenter Prospective Cohort Study. Neurosurgery. (2018) 85:486–93.
18. Yu GJ, Han CZ, Zhang M, Zhuang HT, Jiang YG. Prolonged drainage reduces the recurrence of chronic subdural hematoma. Br J Neurosurg. (2009) 23:606– 11.
19. Weng W, Li H, Zhao X, Yang C, Wang S, Hui J, et al. The depth of catheter in chronic subdural haematoma: does it matter? Brain Inj. (2019) 33:717–22.

Conflict of Interest: Nil Source of support: Nil