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Comparing the Outcome of 3 Different Types of Operative Techniques Practiced for Chronic Subdural Hematoma: A Retrospective Study

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Abstract--Chronic subdural hematoma is a common condition of the neurosurgical department requiring surgical intervention. This is a retrospective study of Fifty cases of chronic subdural hematoma (CSDH) patients treated at SGT Medical College, Hospital, and Research Institute were enrolled in this study. The patients were divided into three groups based on the surgical technique performed: single bur-hole drainage (group A, n=40), double bur-hole drainage (group B, n=5), or craniostomy[Twist drill] with evacuation of hematoma (group C, n=5). The results of this study shows that craniostomy[Twist drill] with the evacuation of hematoma in CSDH patients significantly reduced the risk of recurrence, regardless of the

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number of burr holes used. We, therefore, recommend the use of craniostomy[*Twist drill*] with the evacuation of hematoma in CSDH patients.

Keywords---chronic subdural hematoma, craniocerebral injury, hematoma evacuation, neurosurgical, subdural hematoma.

Introduction

Chronic subdural hematoma(CSDH) is a collection of blood and blood breakdown products in the subdural area. It is a common condition encountered in the neurosurgical department that requires surgical intervention. It's frequency is rising due to the growing geriatric population and increased use of anticoagulant and antiplatelet medication (Kolias et al., 2014). The male: female ratio is 3:1, and the condition mostly presents as mental abnormality, headache, limbs weakness, a decrease in the level of consciousness in 10% to 20%, and a history of mild head injury in 50% to 70% (Mori & Maeda, 2001). The frequency of CSDH in patients whose age is more than 70 years is 58/1lakh/year compared to patients whose age is less than 65 years is 3.4/1lakh/year (KUDO et al., 1992). CSDH can present heterogeneously, often mimicking stroke or dementia, but is usually easily diagnosed as a predominantly hypodense or isodense crescentic collection on unenhanced CT (Stippler et al., 2013). Patients with CSDH are increasingly being managed by multidisciplinary teams—including neurologists and elderly care physicians—making it crucial for these specialties to be familiar with its presentation, diagnosis, and management. In CSDH cases the recurrence rate postoperatively ranges from 2 to 37 % making the prediction of CSDH favorable (Kim et al., 2014; Gernsback et al., 2016; Lee et al., 2015; Okada et al., 2002; Jang et al., 2015; Santarius et al., 2008; Lega et al., 2010).

Materials and Methods

Fifty patients with chronic subdural hematoma were studied retrospectively who underwent surgical drainage in SGT Medical College, Hospital, and Research Institute. All patients were examined clinically and neurologically and a brain CT scan was done preoperatively. Laboratory tests include coagulation tests were done for all patients. Surgical procedures were classified into the following three groups according to the surgical procedure used at the surgeon's discretion: single bur-hole drainage (group A, n=40), double bur-hole drainage (group B, n=5), or craniostomy[*Twist drill*] with the evacuation of hematoma (group C, n=5). The surgical drainage was done according to the patient's clinical condition, single bur hole drainage(3-5mm in diameter) was done in all CSDH cases except those who require immediate decompression whereas Craniostomy[*twist drill*] with evacuation of hematoma was done in patients with low GCS or in patients who were on antiplatelet drugs with low GCS and require immediate decompression. In Group A, single bur hole drainage was done on the thickest part of CSDH as showed by brain CT-Scan.Intraoperatively drainage for CSDH cases was done by special technique, tilting operative table up and down, left and right until complete subdural hematoma evacuated. In Group B, 2 bur-holes were made for irrigation through each hole to provide effective irrigation. In Group C,

craniostomy [Twist drill] with the evacuation of hematoma is done. After 3 days of surgery a brain CT was done for all patients to confirm CSDH reduction, and at 1-week intervals to check for recurrence. All patients were evaluated for recurrence through at least 10 days of inpatient treatment and at follow-up visits extending for at least 6 months.

Results

Fifty CSDH patients were successfully treated by surgical drainage. Single bur hole drainage was done in forty patients, double bur hole drainage was done in five patients and craniostomy with the evacuation of hematoma was done in five patients. History of mild trauma was elicited in 40 patients (76%) and 10 patients with no history of trauma, one patient had diabetes mellitus, one had epilepsy and two cases were alcoholics and heavy smokers. Antihypertensive, antiplatelets and anticoagulants drugs were received by 20 patients, 47.6% for a long time. Brain CT-scan shows low-density crescent shape CSDH with midline shift, mass effect, with evidence of brain atrophy in all patients before surgery. After surgery brain, CT scan showing a decreased size of chronic subdural hematoma without midline shift or mass effect, but there was a residual small collection which is not significant.

In Group C, One patient had a recurrence of CSDH after few days of surgery, and evacuation of hematoma was done for the patient through the same Burr Hole craniostomy and one patient died one month after surgery. Hence, it was noted that mortality rate was higher in craniostomy [Twist drill] with evacuation of hematoma as compared to bur hole drainage reason being the patients who underwent craniostomy [Twist drill] with evacuation of hematoma had already low GCS and critical condition resulting in major factor for mortality.

Discussion

CSDH is one of the reversible causes of dementia and disability in elderly patients. An early diagnosis of clinical suspicion and radiographic evaluation may allow for early treatment to avoid a poor prognosis. Thankfully, the routine use of CT scanning in most emergency facilities has made the diagnosis of these lesions commonplace (Chen & Levy, 2000).

CSDH is a common disease in geriatric patients and is mostly seen in neurosurgical practice. With an increasing number of elderly people in the general population, there is a need to investigate risk factors (age, falls, and anticoagulant or antithrombotic therapy) that are causing the disease. Baechli et al. did a study on 354 CSDH patients who underwent surgery for a period of 7 years (1996–2002), the incident is equally distributed over these years. CSDH cases were reported more in patients age above 65 years than in younger patients (69 vs. 31%) and in men than in women (64 vs. 36%). Falls were recorded in 77% of cases. A higher risk of falls was mostly seen in elder patients. Antithrombotic or anticoagulant therapy was present in 41% of patients, 32% of them having had falls. Overall small postoperative mortality in CSDH cases was 0% and the overall recurrence rate in CSDH cases was 13.6%. The CSDH cases of older men are

associated with falls and antithrombotic or anticoagulation therapy (Baechli et al., 2004).

CSDH is associated with high levels of vasoactive cytokines, inflammatory mediators, and fibrinolytic factors (Jang et al., 2015; Taussky et al., 2008; Edlmann et al., 2017). Saito et al. (1989), reported that the risk of CSDH recurrence increased when these factors remained after surgery, so complete evacuation is important for low recurrence rates. The current treatment of choice for CSDH is burr-hole drainage (Jang et al., 2015), but the optimal surgical technique remains controversial (Leroy et al., 2015). Taussky et al. (2008), reported a higher recurrence rate in a 34-cases with single burr-hole group than in a group containing 63 cases where two burr-holes were used, but Han et al. (2009), reported a higher recurrence rate in a 129-cases double burr-hole group than in a 51-case single burr-hole group. In addition, three large retrospective studies reported no significant difference in the recurrence rate between single and double burr-hole drainage procedures (Gernsback et al., 2016; Kansal et al., 2010; Pahatouridis et al., 2013), which concurs with our observations.

A retrospective study was done by Asghar et al, on 40 CSDH patients with more than 65 years of age reported an incidence of 8.2/1lakh. Falls (57%)and antithrombotic therapy (33%) were the most common risk factors. The common charterstitics were altered mental state (52%) and focal neurological deficit (50%). In the unoperated group, mortality was 7/16 (44%). Most of the deaths reported in this series were either due to CSDH or to the complications of frailty and poor mobility. The Surgery itself was generally successful (Asghar et al., 2002).

Many studies have investigated CSDH recurrence. The factors associated with its recurrence after surgery are diabetes mellitus, anticoagulant therapy, lack of use of angiotensin-converting enzyme inhibitors, male gender, the presence of bilateral hematomas, midline shift of more than 1 cm, with the presentation of hemiparesis, but the results that were published contain considerable variation (Gernsback et al., 2016; Leroy et al., 2015; Tahsim-Oglou et al., 2012; Weigel et al., 2007; Lin et al., 2014; Jung et al., 2015; Chon et al., 2012; Tugcu et al., 2014).

Conclusion

In CSDH cases surgical drainage is a safe and effective treatment. craniostomy [Twist drill] with evacuation of hematoma play an important role in the management of CSDH patients with comorbidities or having low GCS who require immediate decompression where craniotomy can't be done whereas single bur hole drainage or double bur hole drainage have similar results with single bur hole drainage have low recurrence rate.

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