Chronic subdural hematoma case series

2020

A total of 90 patients (71 men and 19 women), aged 41-100 years (mean age, 76.4 ± 11.2 years), were included. CSDH recurred in 17 patients (18.9%). A higher Charlson Comorbidity Index (CCI) correlated with higher scores in the NIHSS. In the univariate analysis, recurrence was associated with a higher CCI (2.39 vs 1.22, p = 0.002), higher NIHSS scores (6.5 vs 4, p = 0.034), and lower prothrombin time (PT) levels (9.9 vs 13.4, p = 0.007). In multivariate analysis, only PT and CCI demonstrated to be independent risk factors for CSDH recurrence after surgical evacuation (p = 0.033 and p = 0.024, respectively). Patients with more comorbidities have a higher risk of developing recurrent CSDH. Charlson Comorbidity Index (CCI) provides a simple way of predicting recurrence in patients with chronic subdural hematoma and should be incorporated into decision-making processes, when counseling patients.

A Institutional based cross-sectional retrospective study was conducted among patients operated for CSDH from January 1, 2012 to December 31, 2015 at Teklehaymanot General Hospital, a private hospital in Addis Ababa, Ethiopia. Descriptive statistics, using SPSS version 20, was used to determine the postoperative outcomes including hospital stay, complications and recurrence rate.

Of the 195 charts reviewed, 70.3% were of males, with M: F ratio of 2.4:1. 68.2% of patients being above the age of 55 years with a mean age at presentation of 57.63. The most common presenting symptom was headache followed by extremity weakness. The diagnosis of CSDH was made with either head CT scan or MRI. Forty one percent of patients had a left side hematoma and 48(24.6%) patients had bilateral CSDH. All patients were operated with a single burr hole evacuation under local anesthesia and postoperative subdural closed system drainage by a single neurosurgeon. The mean hospital stay was 3.68±2.6 days. The postoperative outcome was assessed using the Glasgow Outcome Score, and 95.9% of the patients reported good recovery. Thirteen (6.6%) patients were operated twice for recurrence, and there were four deaths.

Single burr hole trephination for chronic subdural hematoma is an easy, safe and effective technique.

Gazzeri et al. conducted a single-center retrospective analysis on 414 patients surgically treated for CSDH over a period of 6 years. Comparisons were made after dividing the patients into 4 groups based on the surgical technique and type of drainage: Single burr hole with subdural drainage (Group Ia), single burr hole with subgaleal drainage (Group Ib), craniotomy with subdural drainage (Group Ila), and craniotomy with subgaleal drainage (Group Iib). 238 cases underwent a burr hole with irrigation, while 290 cases were treated with craniotomy. Of the analysed patients, subdural drainage was inserted in 382 cases, while subgaleal drain was used only in 146 patients, for a total of 528 procedures.

Re-operation was performed in 9.47 % of cases. The frequency of re-intervention for recurrences appeared to be lower in the Group Ia (5.06 %), while the frequency of the re-intervention was higher in the craniotomy with subdural drainage group (Group Ila, 11.6 %). 14 patients (2.65 %) developed acute subdural rebleeding in the immediate postoperative period with 6 of them on
antiplatelets/anticoagulants in the preoperative period.

**Recurrence** rate and functional outcome after surgical drainage of CSDH does not appear to be affected by surgical technique (craniotomy vs burrhole) and drainage location. To our opinion, surgeons may elect procedures on a case-by-case basis.

**2019**

Certo et al. retrospectively analysed the clinical and radiological data of a minimally invasive, percutaneous draining system (Integra™) used in fifteen patients (Group A; mean age: 75.7) with CSH, and compare them with those obtained from two retrospective series of patients: the first one (Group B 15 patients, mean age 77.1) treated with standard, single-burr hole technique for subdural drainage under general anaesthesia; the second one (Group C 15 patients, mean age 76.4) treated with standard, single-burr hole technique for subdural drainage under local anaesthesia and mild sedation. All The percutaneous procedures (Group A) were performed under local anaesthesia.

Mean follow-up was 10.9 (range 3-14), 18.2 (range 10-29) and 15.2 (range 8-28) months in Group A, B and C respectively. Three of 15 and in Group B experienced a worsening of pre-existing neurodegenerative disorders after general anaesthesia. One patient in group C suffering from Parkinson’s disease experienced a worsening of gait disturbances. Post-operative CT scans were performed at 48 h and 21 days after the operation. An early post-operative CT-scan, obtained immediately after surgical procedure, was performed in all Group A patients. No differences in CSH evacuation were observed comparing the three groups. Two recurrent hematomas, one in group A and one in group B, required revision. Post-operative hospitalization was similar (5.1 vs 5.7 vs 5.6 days, respectively, in group A, B and C) but analgesics use was lower in Group A.

Pre-operative evaluation of radiological features of CSDHs is crucial in determining the right indication for a minimally invasive drainage. Minimally invasive treatments of CSH may reduce the use of anaesthetic drugs and worsening of pre-existing neurodegenerative disorders.

Tommiska et al., conducted a retrospective observational study including consecutive patients undergoing **burr hole trephinations** for CSDHs. They compared outcomes between a six-month time period when the SD placement was arbitrary (July to December 2015) and a time period when **subdural drain** (SD) placement for 48 h was routine (July to December 2017). The primary outcome of interest was recurrences requiring **reoperation** within six months. Furthermore, patient **outcome**, **infections** and other **complications** were assessed.

A total of 161 patients were included, of which 71 (44%) were in the SD group and 90 (56%) in the non-drain group. There were no differences in age, comorbidity, history of trauma or use of **antithrombotic** medication between the groups (p>0.05). Recurrences within six months occurred in 18% of patients in the non-drain group compared to 6% in the SD group (p=0.028; OR 0.28; 95% CI 0.09-0.87). There were no differences in neurological outcome (p=0.72), mortality rate (p=0.55), infection rate (p=0.96) or other complications (p=0.20).

The change in practice from no drain to SD after burr-hole craniostomies for CSDHs effectively reduced the six-month recurrence rate without any effect on patient outcome, infections or other complications.
A total of 763 patients with surgically evacuated unilateral CSDH were included for analysis. The recurrence rate was 14% while 12% of patients died during follow-up (1 year). In a association model, hematoma size, drain type, drainage time, presence of complications, and Glasgow Coma Score were significantly associated to recurrence. Subdural drain was associated with a lower recurrence risk than subgaleal drain. The preoperative model included hematoma size, hematoma density, and history of hypertension. The postoperative model included further drain type, drainage time, and surgical complications.

The nomograms allow easy assessment of the recurrence risk for the individual patient, providing a better possibility for individual adjustment of treatment and follow-up. The predictive performance indicates that significant unaccounted or unknown factors still remain. The association test found passive subdural drain superior to passive subgaleal drain in minimizing the risk of CSDH recurrence.

A retrospective analysis of 201 cases of CSDH diagnosed and treated at Beijing Shijitan Hospital (CMU) from January 2006 to December 2017 was conducted. From January 2006 to December 2010, 126 cases of CSDH were treated with skull drilling and drainage (non-endoscopic group). From January 2011 to December 2017, 75 cases of CSDH were treated with soft neuroendoscopy (endoscopic group). The operation time of the non-endoscopic and endoscopic groups, the hematoma clearance rate on the first day after surgery, the time of the drainage tube, the length of hospital length of stay, the incidence of complications, mortality and recurrence rate were compared.

There were no deaths in both groups. The average operation time of the non-endoscopic group was 43 min, compared with the average operation time of the endoscopy group of 50 min, there was no significant difference (P>0.05). The average hematoma clearance rate on the first day after surgery in the endoscopy group (98.2%) was significantly higher than that in non-endoscopic group (87.3%) (P<0.01). The average time of drainage tube in the endoscopy group (23 h) was significantly shorter than that in the non-endoscopic group (50 h) (P<0.01). On the first postoperative day, the proportion of patients with mRS\(\leq 3\) in the endoscopic group was significantly higher than that in the non-endoscopic group (P<0.01). At the time of discharge, the proportion of patients with mRS\(\leq 3\) in the endoscopy group was also significantly higher than that in the non-endoscopic group, P<0.05. There was no significant difference in the average hospital stay between endoscopy group (7 d) and non-endoscopic group (8 d) (P>0.05). The postoperative complication rate in the endoscopy group was significantly lower than that in the non-endoscopic group (P<0.01). During 0.5-8 years of follow-up, the recurrence rate of CSDH in the endoscopic group (5.33%) was significantly lower than that in the non-endoscopic group (15.07%) (P<0.01).

The application of visualization features of soft neuroendoscopy in the treatment of CSDH can significantly improve hematoma clearance, shorten the time of drainage tube, reduce postoperative complications and recurrence rate, and improve surgical outcomes.

2018

Glancz et al. from the Department of Neurosurgery, Queen's Medical Centre, Derby Road, Nottingham, Edinburgh, Royal Victoria Infirmary, Newcastle, and Addenbrooke's Hospital, Cambridge, United Kingdom, performed a subgroup analysis of a previously reported multicenter, prospective cohort study of CSDH patients performed between May 2013 and January 2014. Data were analyzed.
relating drain location (subdural or subgaleal), position (through a frontal or parietal burr hole), and duration of insertion, to outcomes in patients aged >16 yr undergoing burr-hole drainage of primary CSDH. Primary outcomes comprised modified Rankin scale (mRS) at discharge and symptomatic recurrence requiring redrainage within 60 d.

A total of 577 patients were analyzed. The recurrence rate of 6.7% (12/160) in the frontal subdural drain group was comparable to 8.8% (30/343) in the parietal subdural drain group. Only 44/577 (7.6%) patients underwent subgaleal drain insertion. Recurrence rates were comparable between subdural (7.7%; 41/533) and subgaleal (9.1%; 4/44) groups (P = .95). They found no significant differences in discharge mRS between these groups. Recurrence rates were comparable between patients with postoperative drainage for 1 or 2 d, 6.4% and 8.4%, respectively (P = .44). There was no significant difference in mRS scores between these 2 groups (P = .56).

Drain insertion after CSDH drainage is important, but position (subgaleal or subdural) and duration did not appear to influence recurrence rate or clinical outcomes. Similarly, drain location did not influence recurrence rate nor outcomes where both parietal and frontal burr holes were made. Further prospective cohort studies or randomized controlled trials could provide further clarification.

A burr hole opening with closed system drainage was performed on 124 chronic subdural hematomas (CSDHs) in 102 patients of the Department of Neurosurgery, Teikyo University Hospital Mizonokuchi, Futago, Takatsu-ku, Kawasaki, Kanagawa, Department of Neurosurgery, Teikyo University Medical School, Kaga, labashi-ku, Tokyo Japan, Department of Neurosurgery, Loma Linda University Medical Center, California USA. Hematoma thickness and midline shift were measured by computed tomography scan and hematoma pressure was measured with glass manometers in surgery. In accordance with Laplace's law, tension on the motor cortex was calculated as (half the hematoma thickness × hematoma pressure)/2. Student’s t-test and Pearson value (r: relationship index) were applied in statistical analysis of findings.

Motor weakness was identified in 76.5% of our cases, and severity of hemiparesis showed no correlation with age. Tension was strongly related to hemiparesis (r = -0.747, p<0.01), whereas hematoma thickness (r = -0.458, p<0.01) and pressure (r = -0.596, p<0.01) were moderately correlated with hemiparesis. Fourteen patients (13.7%) complained of headache and mean age of these patients was much younger than those without headache (p<0.01). Stronger midline-shift (p<0.01) and greater ratio of midline-shift to hematoma thickness (p<0.01) were statistically correlated with headache. Recurrence of CSDH was recognized in eight patients (7.8%). Seven of them had no further recurrence after a second surgery and one patient required a third surgery. Stronger midline-shift (p<0.05) and greater ratio of midline-shift to hematoma thickness (p<0.05) were statistically associated with recurrence, although hematoma thickness, pressure, and tension were not correlated with recurrence.

Tension is the most influencing factor to development of hemiparesis in patients with CSDH, showing that thick hematoma causes mild motor weakness if the hematoma pressure is low. This study also elucidates the mechanism for quick recovery from hemiparesis after burr-hole surgery in that tension on the motor cortex is decreased immediately by drainage although the subdural space remains wide. However, high tension to the brain cortex was not correlated with either headache or recurrence of CSDH.
A retrospective two-centre study including 151 surgically treated patients. A univariate (Fisher exact test) and multivariate (logistic regression) analysis of possible risk factors influencing outcome was performed. Outcome was expressed as: 6-month clinical outcome, 6-month mortality, complications and length of hospital stay.

Univariate analysis showed an association between Charlson Comorbidity Index (CCI) and 6-month clinical outcome ($p = 0.048$), complications ($p = 0.034$) and 6-month mortality ($p = 0.007$). Antithrombotic drugs were associated with longer hospital stay ($p < 0.001$). Logistic regression analysis showed an association between CCI and complications ($p = 0.016$, HR = 3.18) and 6-month mortality ($p = 0.034$, HR = 11.71), and between antithrombotic drugs and longer hospital stay ($p = 0.002$, HR = 3.07).

Age alone is not a predictor of bad outcome for patients aged 80 years and older surgically treated for CSDH. Charlson Comorbidity Index (CCI) may prove a valuable outcome predicting tool in these patients, and a longer hospital stay may be anticipated for patients under antithrombotic agents 10).

2017

Matsumoto et al. analyzed 492 consecutive patients with CSDH between January 2010 and October 2015. First, we analyzed the clinical factors and compared them between patients with or without brain herniation signs on admission. Second, we compared clinical factors between patients with or without completion of brain herniation after operation among patients who had brain herniation signs on arrival. Eleven (2.2%) patients showed brain herniation signs on arrival, and six patients (1.2%) progressed to complete brain herniation. Patients with brain herniation signs on arrival were significantly older ($P = 0.03$) and more frequently hospitalized with a concomitant illness ($P < 0.0001$). Niveau formation ($P = 0.0005$) and acute-on CSDH ($P = 0.0001$) on computed tomography were also more frequently seen in patients with brain herniation signs. Multivariate logistic regression analysis showed that age older than 75 years (OR 2.16, $P < 0.0001$), niveau formation (OR 3.09, $P < 0.0001$), acute-on CSDH (OR 14, $P < 0.0001$), and admitted to another hospital (OR 52.6, $P < 0.0001$) were independent risk factors for having had brain herniation signs on arrival. On the other hand, having a history of head injury ($P = 0.02$) and disappearance of the ambient cistern ($P = 0.0009$) were significantly associated with completion of brain herniation. The prognosis was generally poor if the patient had presented with brain herniation signs on admission. Our results demonstrate that the diagnosis is often made late, despite hospitalization for a concomitant illness. When the elderly show mild disturbance of consciousness, physicians except neurosurgeons need to consider the possibility of CSDH regardless of a recent history of head injury 11).

2016

15 patients who underwent operation for CSDHs between June 2012 and June 2014 at Sir Run Run Shaw Hospital of Zhejiang University were included in this retrospective cohort study. The clinical and imaging data of these patients with CSDHs due to spinal CSF leak were retrospectively studied. Fifteen patients, with a mean age of 53.8 ± 8.3 years, underwent operations for CSDH. Hematomas were unilateral in 4 patients and bilateral in 11 patients. Among these patients, eight patients had recurrence of hematomas after operation due to neglect of spinal CSF leak. All patients had fully recovery 12).
All patients with CSDH treated by BHD between January 2012 and December 2014 were included in this study. All patients were classified by symptom, clinical grade, time, location, hematoma density, midline shift, and other characteristics. Pre- and postoperative CT evaluation was performed at 0, 3, and 6 months. Clinical grades were classified with the Markwalder grading score.

Surgical and clinical outcomes were evaluated with the brain expansion rate and modified Rankin Scale (mRS). Brain expansion rate was calculated as the ratio between post- and pre-operative hematoma thickness. Recurrence was defined as the occurrence of symptoms and hematoma on CT within 6 months.

This study included 130 patients over 2 years. Among the variable parameters, young age (<75), iso-density of hematoma on CT, and short duration from symptom to surgery were correlated with good brain expansion. Patients with good brain expansion had fewer recurrences. In terms of mRS, young age, iso-density, and good clinical grade were correlated with good functional outcomes.

Clinicians should be more aware of general conditions and medical problems, especially in elderly patients. Membranectomy should be considered in patients with a long duration of symptoms or hypodense hematomas to promote good brain expansion and good mRS scores.

2013

242 cases of chronic SDH. The cSDHs were classified into four groups; hypodensity, homogeneous isodensity, layered type, and mixed type on the basis of CT scans.

The density of cSDH was isodense in 115 patients, hypodense in 31 patients, mixed in 79 cases, and layered in 17 cases. The cSDH was on the left side in 115 patients, on the right side in 70 patients, and bilateral in 40 patients. The history of trauma was identifiable in 122 patients. The etiology could be identified in 67.7% of the hypodense hematomas, while it was obscure in 59.5% of the mixed hematomas.

Mixed density of cSDH results from multiple episodes of trauma, usually in the aged. It is hard to remember all the trivial traumas for the patients with the mixed density cSDHs. Although there were membranes within the mixed density hematomas, burr-holes were usually enough to drain the hematomas.

2009

Eighty-seven patients with CSDH underwent surgery at a institution from January 2004 to December 2008. The patients were classified into three groups according to the operative procedure; group I, one burr-hole craniostomy with closed system drainage with or without irrigation (n = 25), group II, two burr-hole craniostomy with closed system drainage with irrigation (n = 32), and group III, small craniotomy with irrigation and closed-system drainage (n = 30).

Age distribution, male and female ratio, Markwalder's grade on admission and at the time of discharge, size of hematoma before and after surgery, duration of operation, Hounsfield unit of hematoma before and after surgery, duration of hospital treatment, complication rate, and revision rate were categories that we compared between groups. Duration of operation and hospitalization were only two categories which were different. But, when comparing burr hole craniostomy group (group I and group II) with small craniotomy group (group III), duration of post-operative hospital treatment, complication and recurrence rate were statistically lower in small craniotomy group, even
though operation time was longer.

Such results indicate that small craniotomy with irrigation and closed-system drainage can be considered as one of the treatment options in patients with CSDH 15).

2008

A total of 42 patients treated with the burr hole craniotomy without irrigation with drainage were compared to 40 patients with irrigation and drainage. In both groups, univariate and multivariate analysis revealed that good clinical outcome was associated with preoperative Markwalder grade and the presence of postoperative hematoma recurrence. There was no difference in good outcome between the 2 operative methods.

There was no significant difference between these 2 operative techniques in relation to outcomes whether good or bad. The recurrence rate was 12.2%. When either technique is done properly, no difference to the outcome is seen. Neurosurgeons or general surgeons in Southeast Asia may choose not to irrigate the chronic subdural space, although drainage placement is necessary afterwards 16).

2007

Gazzeri et al. present a technique for the management of chronic subdural haematoma which is a variation of a closed drainage system. After evacuation of the haematoma through a single burr hole, they inserted a Jackson Pratt drain into the subgaleal space, with suction facing the burr hole, allowing for continuous drainage of the remaining haematoma.

They used the method for over 4 years to treat 224 patients. Seventeen patients (7.6%) needed a second operation for a recurrence of the haematoma no patient required a third operation. Postoperative complications developed in 3 patients. Two patients died while in the hospital, a mortality rate of 0.9%.

The use of suction assisted evacuation, is followed by results that compare satisfactorily to reports of previous methods, with a low rate of recurrence and complications. It is relatively less invasive and can be used in high risk patients 17).

References


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