

Comparative Study of Subgaleal Versus Subdural Under Water Drainage System in the Surgical Treatment of Chronic Subdural Hematoma

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Abstract:

Objective: One or two burr-hole craniotomies with subgaleal or subdural drainage system and irrigation are the most common methods for surgical treatment of chronic subdural hematoma. The aim of this study is to compare the advantages or disadvantages of these techniques used for chronic subdural hematoma.

Material and methods: 50 patients were treated by burr-hole subdural drainage or subgaleal drainage system with irrigation. Our patients were classified into two groups according to the operative procedure as follows: Group I, two burr-hole craniotomies with subgaleal drain and irrigation, Group II, one burr-hole craniotomy with subdural closed drainage system without irrigation. We compared both the groups for post-operative clinical and surgical outcome.

Results: In our study there were significantly less number of revision surgery and pneumocephalus in subdural under water drain as compare to subgaleal drain. Most common presenting symptom was headache and vomiting followed by altered sensorium.

Conclusion: Both of the techniques have a higher cure rate. However, subdural under water drainage system is relatively safe, and technically easy. So it is applicable for aged and higher risk patients.

Keywords: Chronic subdural hematoma; subdural drainage; subgaleal drainage; Under water drain.

Date of Submission: 11-07-2019

Date of acceptance: 26-07-2019

I. Introduction

Chronic subdural hematoma is seen frequently in daily neurosurgical practice. Its incidence is about five per one lac per year in the general population but it is higher among those older aged persons¹. Trauma is the most important risk factor for the development of chronic subdural hematoma^{2,3}.

The clinical picture of Chronic subdural hematoma varies widely. Most common presenting symptoms in the headache followed by vomiting and sensorimotor changes such as amnesic or concentration deficits². Surgical treatment of chronic subdural hematoma in symptomatic patients is gold standard therapy. The following types of surgical treatment approaches have been used: craniotomy, twist-drill craniostomy, burr-hole drainage with placement of a subdural drain or subgaleal drainage system.

In our study, we described, and compared the consequences of subgaleal drain and subdural closed drainage systems.

II. Material and Method:-

Prospective Comparative study was conducted in the Department of Neurosurgery, Dr. D. Y. Patil Medical College, Pune during Dec 2016 to June 2018. A total of 50 cases of Chronic Subdural Hematoma (25 cases in Each Group). Group I : comprised of patients of subdural hematoma where subgaleal drain was placed

and Group II : comprised of patients of subdural hematoma where Subdural closed under water drain was placed.

The choice of the surgical technique was decided randomly .Preoperative clinical laboratory parameters measured included bleeding time, platelet count, prothrombin time, and activated partial thromboplastin time. Our study was approved by institutional ethics committee. In all cases, computed tomography was used for diagnosis and postoperative evaluation.

III. Surgical Technique:

All operations were performed under local anesthesia. Patients were placed in the supine position with the head elevated and inclined 20–40 degrees towards the contralateral side of the hematoma. As a prophylactic antibiotic was given before the skin incision.

A skin incision of approximately 4 cm in length was made over the maximum thickness of the hematoma, generally the parietal bump. Burr-hole craniostomy was performed with the high speed pneumatic drills. The duramater was incised and bleeding foci were coagulated by bipolar coagulation. The outer and inner membranes of the hematoma were coagulated and incised and hematoma was drained. Then irrigation of the hematoma cavity with sterile saline at 37°C was made until clear fluid came out of the burr hole. A 10 F drainage tube was placed in the subgaleal area and the terminal end of the tube was positioned over the burr hole in Group I. In Group II, the drainage tube was inserted and left in the subdural space and distal end of tube was connected with under water drain. Incision closes in layers. The drainage tubes were removed 48–72 hours after the surgery in Groups I and II. Prophylactic antibiotics were used post operatively.

IV. Statistical methods and Data Analysis:

Data was entered in Microsoft Excel and analyzed using SPSS 20 Software. Mean & standard deviations were reported for quantitative variables, and frequency & percentages were reported for categorical variables. Chi square was applied for comparison of complication between two Groups and $p < 0.05$ was considered as statistically significant at 95% Confidence interval.

Results: Mean age of each group was 55.14 ± 12.25 years in Group I, 59.14 ± 11.55 years in Group II respectively. Most common clinical features of the patients were headache and vomiting followed by altered sensorium. Most common side involved side was right side of brain. There was decrease in thickness of SDH from baseline in 48 to 72 hours after craniotomy among both group which was statistically significant ($p < 0.001$). There was significantly ($p < 0.05$) less number of Pneumocephalous as well as revision surgery for subdural under water seal than subgaleal drain.

V. Discussion:

Chronic subdural hematoma is seen in geriatric patients, and trauma is the most important reason for chronic subdural hematoma¹. Treatment options for chronic subdural hematoma are surgical or nonsurgical therapies. Non-operative treatment of chronic subdural hematoma consists of the use of steroids in low dose or mannitol⁵. Operative treatment of chronic subdural hematoma in symptomatic patients is yet the gold standard of therapy because it allows urgent decompression of the subdural space⁸.

Different operative treatment options have been reported for chronic subdural hematoma, such as twist-drill craniotomy, small craniotomy and endoscopic removal, large craniotomy and membranectomy or burr-hole craniotomy with or without continuous closed drainage system and continuous subgaleal suction drainage or burr-hole trepanation and a sub periosteal drainage system^{9,10}

In this study, we compared two surgical techniques including burr-hole craniostomy, subdural and subgaleal drainage systems. Besides, we discussed the advantages and disadvantages of these techniques.

According to Gazzeri et al. subgaleal closed drainage system has a low rate of recurrence and pneumocephalus¹⁴. Also, some researchers have reported lower recurrence rates with the use of postoperative drains¹⁶. Use of closed system drainage reduces the risk of recurrence without additional risk of complications¹⁷. In our study, rate of recurrence was 20% in Group I, and 6% in Group II.

Additionally, rates of pneumocephalus were 33 % in Group I and 10% in Group II. Consequently, these techniques have a lower recurrence rate and pneumocephalus.

The craniotomy technique has a low recurrence rate. But it is more invasive and has a greater morbidity and mortality . Nevertheless, craniotomy as a management of chronic subdural hematoma has indications as solid hematoma and multiple recurrences¹.

Its other surgical complication is postoperative seizures. In our experience, rate of seizures was less than 3% in Groups I and II.

Subdural empyema occurred in one of the patient who had undergone subdural drainage. The incidence of postoperative empyema has been reported to range between 0, and 6 percent²¹. Similarly, Gazzeri et al. and

Zumofen et al. reported a very low rate of subdural empyema in association with extra cranial placement of the drain¹⁴.

Postoperative acute hemorrhage was reported in some series in association with the use of subdural drain and burr-hole techniques. Gazzeri et al. and Zumofen et al.¹⁵ have signified that the use of a subdural drain with burr-hole may lead to intracerebral hemorrhage. These drainage catheters may penetrate into the brain parenchyma or injure bridging veins⁵. Placement of subgaleal drainage tube has not any risk of these complications. In our series, we haven't seen any postoperative acute hemorrhage.

Subdural and subgaleal drainage system have a higher cure rate and a lower risk of recurrence. However, subgaleal drainage system is relatively less invasive, safe, and technically easy. Regarding safety, we didn't see any subdural empyema in our patients for whom we used subgaleal drainage system. Since the drainage tube is not in direct contact with the brain tissue and membranes of chronic subdural hematoma in this method, theoretically, there is no risk of acute cerebral hemorrhage. So subgaleal drainage system is practically applicable for higher risk patients.

VI. Conclusions:

Both of the techniques have a higher cure rate. However, subdural under water drainage system is relatively safe, and technically easy. So it is applicable for aged and higher risk patients. Regarding safety, we didn't see any subdural empyema in our patients for whom we used subdural drainage system. So subdural drainage system is practically applicable for higher risk patients, less chance of recurrence and less number of pneumocephalous as compare to subgaleal drain.

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Mubashshir Ali “Comparative Study of Subgaleal Versus Subdural Under Water Drainage System in the Surgical Treatment of Chronic Subdural Hematoma.” *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 7, 2019, pp 74-76.