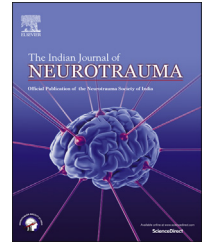


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Original Article

Management of chronic subdural haematoma: Single burr-hole drainage and irrigation using the technique of “syringing”

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ABSTRACT

Background: Chronic subdural haematoma is one of the most common clinical conditions encountered in neurosurgical practice. The surgical approaches exhibit a wide spectrum ranging from simple burr-hole to complex craniotomy with excision of membrane. We tried to approach this condition with a procedure that is safer and faster using a single burr-hole for drainage and a technique of “syringing” the subdural space with normal saline for irrigation.

Aims: We describe our technique of single burr-hole drainage and normal saline irrigation using the technique of “syringing”.

Settings and design: This is a retrospective study wherein we analysed the data of the treated patients contained in the case sheets, operation theatre records and hospital discharge summaries.

Methods and material: Hundred fifty patients who had chronic subdural haematoma were treated surgically from April 2010 to March 2013. All the patients were operated under general anaesthesia. The clinical data at admission, discharge and 3 weeks following discharge was analysed as per the records.

Results: Favourable outcome was seen in all the 150 patients treated. None of the patients had any recurrence. Superficial wound infection was seen in only one patient which subsided with antibiotics.

Conclusions: Single burr-hole drainage and saline irrigation using the technique of “syringing” is a simple, fast and safe procedure for treating chronic subdural haematoma with a favourable outcome.

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1. Introduction

Chronic subdural haematoma is one of the most common entities encountered in neurosurgical practice daily. It

generally occurs in elderly population owing to the age related reduction in brain volume with a corresponding expansion of subdural space. Majority of symptomatic patients need surgical evacuation. The evacuation procedures range from a simple burr-hole drainage to more complex craniotomy with

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membranectomy.¹ Multiple burr-hole drainage is the most favoured technique employed. The present retrospective study analysed the results of single burr-hole drainage with normal saline irrigation using “syringing” technique.

2. Subjects and methods

This is a retrospective study of 150 patients who underwent single burr-hole drainage under local anaesthesia for chronic subdural haematoma (CSDH) from April 2010 to March 2012 at GSL General Hospital in Rajahmundry, India. The data were collected from the patient’s case sheets, operation theatre records and hospital discharge summaries.

A history of sustaining an injury due to fall on level ground could be obtained in all the patients. The average interval between the fall and presentation to the hospital was 1 month. Clinical status at admission was categorized as per the Markswalder chronic subdural haematoma scale² (Table 1). Diagnosis was confirmed by cranial computed tomography scan (Fig. 1).

All the patients were operated under general anaesthesia. The haematoma was drained through a single burr-hole placed at posterior frontal region (Fig. 2). Irrigation of the subdural space was done with warm normal saline using a 20 ml syringe. The technique involved rapid syringing of saline in the form of a jet circumferentially through the burr-hole under controlled pressure with the head in a down initially and then in flat position till the return was clear. Amount of normal saline needed for irrigation ranged between 1 and 2 L. On completion of the irrigation the head was elevated to 30° and the subdural space was slowly filled with saline so as to eliminate air to maximum possible extent before securing a single layered skin closure using 3/0 nylon. A stamp sized gelfoam piece was used to plug the burr-hole opening before closure. The average operating time was 25 min. Postoperatively the patient was adequately hydrated, nursed in flat position, allowed ambulation after 48 h and discharged after 72 h. Use of anticonvulsants was restricted only to those with a previous seizure history. Steroids were not used in any patient. Outcome was assessed in terms of the Markswalder chronic subdural haematoma scale² at three weeks following discharge.

3. Results

The study group consisted of 150 patients of which 130 were males and 20 were females. Their age ranged from 40 years to 86 years with a mean of 65 years. Clinical categorization showed 24 patients in Grade I and 126 patients in Grade II of the Markswalder chronic subdural haematoma scale.² None of the patients operated showed any recurrence. One patient however had superficial wound infection which could be controlled using antibiotics. All the patients operated had a favourable outcome at three weeks following discharge and were upgraded clinically to Grade 0 on Markswalder chronic subdural haematoma scale.²

Table 1 – Markswalder grading scale.²

Grade 0	Neurologically normal
Grade I	Alert and orientated, mild symptoms such as headache, or mild neurological deficits such as reflex asymmetry
Grade II	Drowsy or disorientated, or variable neurological deficit such as hemiparesis
Grade III	Stuporous, but responding appropriately to noxious stimuli, several focal signs such as hemiplegia
Grade IV	Comatose with absent motor responses to painful stimuli, decerebrate or decorticate posturing

4. Discussion

The aetiology of CSDH is not fully understood. Traumatic subdural effusion is widely accepted as a preliminary stage in the development of CSDH.³ Traumatic subdural effusion is a result of arachnoid tearing caused by head injury and this fluid with or without blood in subdural space facilitates the formation of the so called “outer membrane”.⁴ This membrane then forms internal capillaries or sinusoids. These fenestrated blood vessels allow plasma fluid leakage into the subdural space. This phenomenon results in progressive

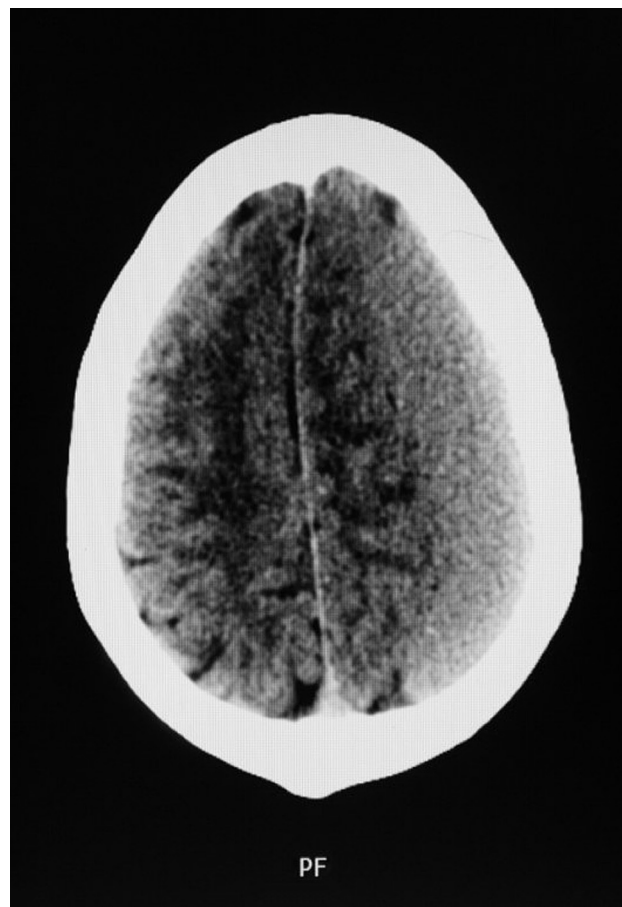


Fig. 1 – Left-sided fronto-parietal chronic subdural haematoma.

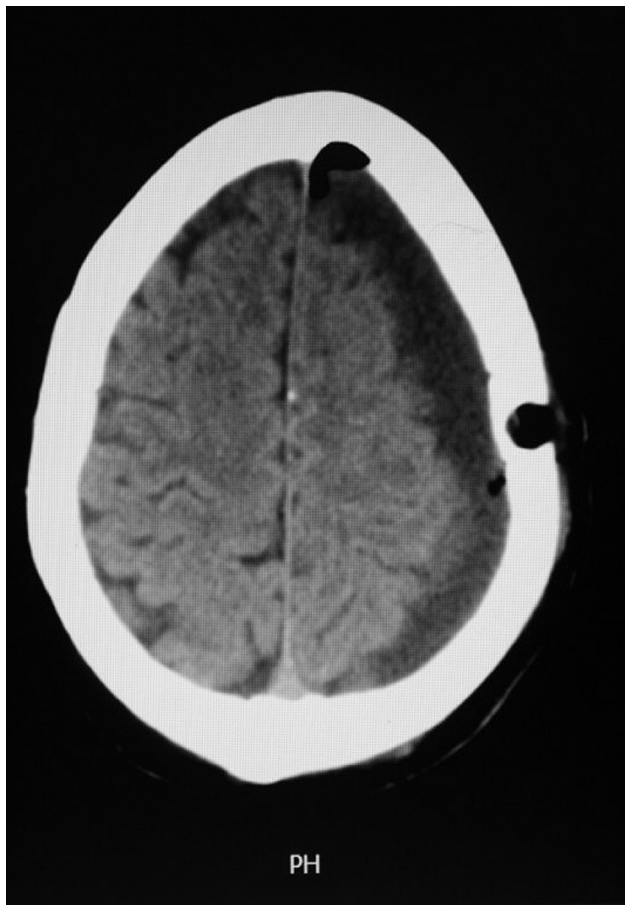


Fig. 2 – Postoperative scan showing the burr-hole location, evacuated haematoma and expanded brain.

expansion of subdural space. Bleeding occurs repeatedly from capillaries with degenerative endothelium and is accompanied by local hyperfibrinolysis which is one of the causes for the growth of effusions into CSDH.⁵ Fluid ingress driven by osmotic gradient generated by the fibrinolytic products in the haematoma further helps in the genesis of CSDH.⁶

There are arrays of surgical procedures on offer in the treatment of CSDH. These include one or two burr-hole craniostomy with or without saline irrigation and closed-system drainage,⁷ twist drill craniostomy with or without drainage,⁸ craniotomy and excision of the subdural membranes,⁹ percutaneous needle trephination and open system drainage with repeated saline rinsing,¹⁰ replacement of the haematoma with oxygen via percutaneous subdural tapping without irrigation and drainage,¹¹ continuous subgaleal suction drainage.¹² The procedures mainly resorted to are twist drill drainage, burr-hole drainage and craniotomy.

Twist drill craniostomy brings with it the advantage of being a quick bedside procedure suitable to frail medically unfit very elderly individuals.⁸ Irrigation through the small aperture is however very difficult and high recurrence rate goes with this technique. Craniotomy with membranectomy is usually employed in patients with thick clots, thick

membrane, multiple loculations and intractable recurrent haematoma.⁹ Burr-hole drainage is the most favoured and practised technique and usually done through the placement of two burr-holes.⁷ Weigel et al analysed 48 publications in a comprehensive meta-analysis comparing the outcome of various surgical techniques.¹³ A wide range of cure, recurrence, morbidity and mortality rates were found with each technique. Overall there was no significant difference in mortality between the three techniques. The morbidity for a craniotomy was reported to be higher than drainage procedures. Recurrence rate was higher with twist drill drainage in comparison with burr-hole drainage.

Burr-hole drainage has been the most preferred technique in treating patients with CSDH. Joon et al in their study compared single burr-hole with two burr-hole technique and found no significant difference in complication rate.¹⁴ Khadka et al published the largest series of 307 patients who were treated for CSDH using a single burr-hole under local anaesthesia.¹⁵ Whereas a red rubber catheter was used by Khadka et al for irrigation, we preferred a 20 ml syringe for the same.

Re-expansion of the brain after haematoma evacuation is the most important guiding factor for good outcome. The re-expansion of the brain is inhibited by presence of residual clots and membrane, air in subdural space, and high brain surface elastance.¹⁶ A single burr-hole is sufficient for drainage of the haematoma and it reduces the operating time. The irrigation of the subdural space that follows helps in evacuation of residual clots and membrane shreds, dilution of profibrinolytic compounds and elimination of air from subdural space. We feel that using syringe irrigation removes the risk of cortical vessel damage that catheter irrigation can possibly inflict. The rapidity of syringing decreases the irrigation time. The controlled pressure and circumferential syringe irrigation may help in breaching of membrane and removal of far off clots along with membrane shreds. Using controlled pressure syringing is a necessary precaution to minimize the possible pressure injury to the cortical vessels by the saline jet. The soft jet of saline during irrigation may also help in reducing the brain surface elastance. All the above factors may have contributed to the favourable outcome seen in our series of patients.

5. Conclusion

The present study shows that a single burr-hole with irrigation using “syringing” technique may be sufficient to achieve a favourable outcome in the treatment of patients with CSDH. A short operating time, ease and simplicity of this technique are pointers in favour of it. However a well planned and designed prospective randomized trial with larger study is needed to back up this finding.

Conflicts of interest

All authors have none to declare.

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