



Post-traumatic cerebrospinal fluid Rhinorrhea, transcranial approach and Surgical Outcomes.

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Article received on:

18/03/2020

Accepted for publication:

20/06/2020

ABSTRACT... Objective: To assess the outcomes of the transcranial approach in traumatic cerebrospinal fluid rhinorrhea. **Study Design:** Descriptive study. **Setting:** J.P.M.C, Karachi. **Period:** 15-1-2017 to 17-7- 2019. **Material & Method:** Total of 57 patient were included. Including criteria were patient with a history of trauma, fall, assault, and delayed onset, however, patients presenting with spontaneous cerebrospinal fluid (CSF) rhinorrhea, brain abscess, brain space-occupying lesion, skull base surgery operated elsewhere were excluded. fascia lata, Pericranial flaps were used for the surgical repair. Data were analyzed on SPSS version 22.0. **Result:** Patients gone through the surgical approach having intradural repair in all patients, 25 (43.85%) patients with fascia lata graft while pericranium in 32 (56.1%) and the defect was filled with small bone pieces. In 38(66.6%) unilateral sub frontal approach was done while in 19 patients (33.3 %) biconoral craniotomy was carried out. All patient had dura defect, 37 patients (64.9%) had a fractured cribriform plate, 9 (15%) patient had fovea ethmoidal fracture. 30(52.63%) had right side leak, 20 had left side leak (35%), 7(12.28%) had bilateral from both nasals leakage. No reoperation was done. 93% procedure showed successfully. **Conclusions:** This method is effective with the low rate of morbidity in patients, it can be preferred for traumatic cerebrospinal fluid (CSF) leaks with the injuries associated with the brain, recurrent leak cases with a success rate of > 93%.

Key words: Cerebrospinal Fluid (CSF) Rhinorrhea, Transcranial Approach.

Article Citation: Kalhoro A, Samad A, Javeed F, Hassan S, Rehman L. Post-traumatic cerebrospinal fluid Rhinorrhea, transcranial approach and Surgical Outcomes. Professional Med J 2021; 28(6):891-895.
<https://doi.org/10.29309/TPMJ/2021.28.06.4870>

INTRODUCTION

Cerebrospinal fluid (CSF) rhinorrhea is the state in which the fluid, which surrounds and protected brain, finds its way through the nose, ears or sinuses and it often occurs as a very watery runny nose. This condition only occurs when arachnoid membrane dura and the bones show laceration tearing.¹ CSF rhinorrhea may develop via trauma, spontaneously, brain tumour, radiation, and many other methods. Usually, It occurs in young adults, more common presentation is rhinorrhea than Otorrhea.² CSF leak can be spontaneous or traumatic, although the majority of traumatic leaks can stop spontaneously with no harm or it may proceed and the patient may develop pneumocephalus, headache or meningitis (7% to 30%). The role of prophylaxis antibiotic remains controversial for traumatic CSF rhinorrhea^{3,5} Test available for diagnosis are nasal secretions for

glucose testing, ring sign-on linen, or computed tomography cisternography (CTC), but these are less sensitive for confirming CSF leak pathway compared to high-resolution CT (HRCT) which is considered the initial study for confirmation of path & localization.⁴ while Beta transferrin is the gold standard test.⁵ Even post-surgical CSF rhinorrhea can occur especially surgeries of the pituitary, olfactory and groove meningioma.⁶ Surgical intervention is a necessity, to save the patient from morbidity related to rhinorrhea.⁷ Multiple approaches are available like endoscopic approach which has equally better and comparatively less invasive, bur it requires special training and instrument such procedure is available at few centres in our country⁸ and transcranial approach, unilateral, bo coronal and Fascia lata is reliable with and suitable for filling the defect or floor construction.⁹ The Glasgow coma

scale (GCS) used as a practical approach for the assessment of impairment of conscious level to assessed as a score between 13-15 patients have a mild head injury while 9-12 of the patients are as moderate and 3-8 patients as severe help in the calculation of severity of the head injury can be assessed it.¹⁰

The rationale of our study was to focus on the outcome of the transcranial approach on patient presenting with CSF leak at our institute.

MATERIAL & METHODS

This study was prospective descriptive, which was conducted at neurosurgery ward of JPMC Karachi, from January 2017 to July 2019. Inclusion criteria were patient from both genders, Patients with a history of fall, trauma, assault, delayed onset, and failed to conservative management or previous surgical complication, failed endoscopic procedure for repair. Exclusion criteria were patients with brain space-occupying lesion (brain tumor), spontaneous cerebrospinal fluid (CSF) rhinorrhea, brain abscess. Consent was taken. The patient's relevant history was taken, investigations and examination plain skull X-Ray, brain MRI brain and high-resolution CT scan brain were done. Subfrontal approach, bicoronal Transcranial intradural repair approach was done. In majority cases, pericranial flap, fascia lata was used for the surgical repair. The data analyzed was done on SPSS version 22.0.

RESULT

This study was conducted among 57 patients, out of which 19 (33.33%) patient were female and 38 (66.6%) patients were male and the duration of the study was 30 months, The age ranged was between 11 years to 68 years, mean age was 40.7 ± 14.9 years. 36 (63.31%) patients had road traffic injuries, 13 (22.8%) patients had a history of falls, while 8 (14%) cases were of assault. symptomatically patient presented as headache 52 (91.2%), vomiting 42 (73.6%) and seizures 22 (38.5%) as shown in Table-I.

Halo sign in 53 (92.2%) and reservoir sign 55 (96.4%) patient were found positive on examination. The surgical approach was

an intradural repair used in all patients with pericranium graft in 32 (56.1%) and fascia lata graft in 25 (43.85%) patients plus bony defects were identified in 46(75.4) patients and filled with Smallbone pieces, No other cerebrospinal fluid (CSF) drainage pathway was provided post-operative like Lumber drain. In 38(66.6%) unilateral sub frontal approach was done while in 19 (33.3 %) patients bicoronal craniotomy was performed Table-II.

All patients had dura defect, cribriform plate fracture was seen in 37 patients (64.9%) patients, 9 (15%) patient from fovea ethmoidal fracture. 30(52.63%) had right side leak, 20 had left side leak (35%) 7(12.28) had bilateral from both nasals leakage. As complication 2 (3.5%) patient had a post-operative seizure, 1 (1.7%) patient developed pneumocephalus and 1 (1.7%) patient meningitis while no death was reported and no reoperation was done. 93% procedure showed successfully without any complication or mortality.

s.no	Presentation	n=57	Percentage
1	Headache	52	91.2%
2	Vomiting	42	73.6%
3	Fits	22	38.5%
4	Meningitis	12	21%

Table-I.

Approach	Number	Percentage
Bicoronal approach	19	33.3%
Unilateral approach	38	66.6%
Cribriform plate #	37	64.9%

Table-II

DISCUSSION

Kizmazoglu et al¹¹ used the transcranial surgery method in his study. They reviewed 23 patients with CSF rhinorrhea. Among them 7 (30.4%) patient had spontaneous, 11 (47.8%) had traumatic, and iatrogenic cerebrospinal fluid (CSF) leakage in 5 (21.7%) patients. 12 patients were approached through transcranially, 2 with an endoscopic method and 9 conservatively. the final success rate was 91.6% for the transcranial approach, compared it to our studies we don't have any patient of spontaneous cerebrospinal

fluid (CSF) rhinorrhea and the success rate of these patients was 93.34%.

Kljajić V¹² performed endoscopic repair with a success rate as high as (97%) with one patient had recurrent CSF leakage postoperatively that was post tumour surgery patient. Two patients developed hydrocephalus, one developed encephalopathy. While in our study of transcranial approach two patient had pneumocephalus and two had seizures. Rahman ZU et al¹³ 60 patients were studied. 46 (76.6%) males and 14 (23.3%) were female, history of a road traffic accident in 36 (60%), fall from height in 14 (23.3%). The success rate was 90%. Complications included recurrent CSF leak in 6 (10%), 4 (6.67%) had meningitis, 10 (16.67%) patients developed pneumocephalus and 06 (10%) patients with loss of smell after surgery. Similarly in our study success rate was 93.34%, two patients had pneumocephalus and two had fits. Pillai P et al¹⁴ had a review of multiple studies with tension pneumocephalus (TP) of 20 patient 17 male and 23 female patients presented with most common presenting symptoms/signs were depressed conscious level (10/20), CSF rhinorrhea⁹, headache⁸, and Seizures in 3 patients. Two deaths were reported due to tension pneumocephalus and one due to intracranial pressure (ICP) monitoring-related complication as in our study no ICP monitoring was done and no mortality was reported due to TP. Mathias T et al¹⁵ reviewed the literature and summarized that closure results in less morbidity and better long term outcome.

Hai-sheng L et al¹⁶ use of soaked cotton of fluorescein was and results were 100% accurate for diagnostic purposes in CSF rhinorrhea spontaneous in 10 patients and accidental trauma in five patients. The intraoperative use of fluorescein intranasal precise in locating CSF. It had achieved a 100% success rate in 15 patients with no recurrence. As for our centre X-Ray, brain MRI brain and high-resolution CT were done so establish the diagnosis and identify the defect.

Oakley GM et al¹⁷ were not in favour of prophylactic use of medication and lumbar drainage in his study literature was not inclined in favour of the

regular role of prophylactic antibiotics, and the use of lumbar drainage while performed endoscopic procedure also supported that large defects show good results with vascularized grafts. while at our centre we did not use lumbar drain but similarly used fascia lata and temporal muscle as the graft.

Mossop CM et al¹⁸ study showed that continuous leak of CSF has 20%–50% chance infection like empyema, meningitis, brain abscess especially with those having more than five days persistent. While in our study we had meningitis in one patient.

Cooper T¹⁹ 46 patients (26 female and 20 male). Emergence of the cerebrospinal fluid (CSF) leakage documented from Posterior Cranial Fossa in three patients three patient and Middle Cranial Fossa in those 7 patients the Posterior Cranial Fossa leaks presented with meningitis compared with only 7 in the Middle Cranial Fossa group. The study also had parameters based on lumbar puncture, BMI and opening pressures. The Posterior Cranial Fossa (PCF) leakage can be corrected by using a trans mastoid method with multi-layer closure of the defect in bony and graft of fat closure of mastoid while in our study only traumatic rhinorrhea was preferred, nasal origin, in contrast, we did not account lumbar puncture or BMI

CONCLUSION

This method is effective with the low rate of morbidity in patients, it can be preferred for traumatic cerebrospinal fluid (CSF) leaks with the injuries associated with the brain, recurrent leak cases with a success rate of > 93%.





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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Aurangzeb Kalhoro	Proposed topics and basic study design, manuscript, writing & data collection.	
2	Abdul Samad	Analysis of data, Study design and methodology.	
3	Farrukh Javeed	Methodology, Study design, Data collection.	
4	Sher Hassan	Statistical analysis, Manuscript writing.	
5	Lal Rehman	Interpretation of results, Final literature review.	