

The Incidence and Treatment of Cerebrospinal Fluid Leakage Following Repair of Congenital Spinal Pathologies

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ABSTRACT

Objective: The study's goal is to find out how often individuals with myelomeningocele and TCS repair have leakage of cerebrospinal fluid.

Study Design: Cross-sectional

Place and Duration: Women medical college Abbottabad and Children hospital and the institute of child health, Multan, during the period July, 2021 to Dec, 2021.

Methods: There were 55 participants of both sexes in this research. Those being treated ranged in age from 5 to 20 years old. After obtaining written permission, we collected demographic data on each patient, including their age, gender, and BMI measurements. There were patients who had TCS repair as well as those who had undergone myelomeningocele repair procedures. It was determined how often cerebrospinal fluid leaks occurred in patients. SPSS 22.0 was used to analyze all of the data.

Results: Among 55 cases, majority were males 32 (58.2%) and 23 (41.8%) were females. Included patients had mean age 9.5±6.14 years. Frequency of CSF leak was found among 18 (32.7%) patients. The mean duration of CSF leaks was 13.11±10.34 days. In 18 patients of CSF leaks, Frequency of MMC repair was 11, TCS release was found in 3 patients and meningocele repair in 4 patients. With the use of tincture benzoyl-enhanced primary wound healing in three patients with CSF leaks during surgery, the HCP postoperative signs were resolved. HCP was found in two further patients after their sutures mended with benzoyl tinctures, and they were placed in the shunt.

Conclusion: In this research, we found that CSF leaks are more common in patients having myelomeningocele and TCS repair. Skin-healing tincture benzoyl will help these people.

Keywords: Cerebrospinal fluid leak (CSF), Tether cord syndrome (TCS), Myelomeningocele (MMC)

INTRODUCTION

We wanted to see how often CSF leaks are and what role tincture benzoyl has in treating them after spinal abnormalities such as myelomeningocele, meningocele, and tethered cord syndrome had been repaired. Congenital defects may cause spinal dysraphism, which results in a faulty neural arch through which meninges or neural components can herniate and cause a range of clinical symptoms. These can be either aperta (obvious lesion) or occulta (hidden lesion) (with no external lesion). [1,2] Myeloschisis and Rachischisis are two examples of abnormalities that may emerge from this condition. Meningocele is one of the most common abnormalities that can occur. It is believed that between 2-4 people out of every 1000 are affected by one of these diseases in underdeveloped countries because of the inadequate nutrition and maternal health care that prevails there. The linked abnormalities include bladder dysfunction, foot anomalies, heart issues, and anomalies of the central nervous system in the form of hydrocephalus. [3] Nursing care and the prevention of consequences such as meningitis and increasing weakening depend on the repair of these defects being performed correctly. [4] However, there are risks associated with this procedure, including CSF leak, wound dehiscence, and infection. Patients may get even more ill as a result. These individuals are also at a higher risk of undergoing further procedures such as VP shunts because of the hydrocephalus that they have. [5]

For a long time, the bulk flow model has been used to explain how CSF is formed, distributed, and absorbed during surgery. A recent review of CSF flow-related illnesses suggests that this model is insufficient to explain the pathophysiological underpinnings of these disorders. Pulsatile CSF flow, lymphatic system, capillary exchange, and the conventional ventricular-cisternal system are all part of the current acknowledged CSF flow system. The choroid plexus of the lateral and fourth ventricles is the primary source of CSF generation, according to current knowledge. CSF turnover is aided by the interstitial space,

ependyma, and nerve root dural sleeves, in addition to the spinal canal. [6]

There are several ways in which CSF may be absorbed, with the dural venous sinuses serving as the primary drainage location for CSF. [7]

CSF leaking in individuals with bacterial meningitis might be caused by anatomical flaws or contiguous spread of the illness, or it can be a result of surgery for trauma. [8,9] However, CSF leaking might go unreported even when rhinorrhea and otorrhea are present [10]. In individuals who have had a skull-base fracture as a result of a head injury, CSF leaking usually goes away on its own within 24 hours [11,12], but in 7–30% of patients who have it continue, meningitis develops [13,14]. 3–8% of patients with community-acquired bacterial meningitis and 38% of patients with recurrent meningitis have been shown to have leaking of cerebrospinal fluid in the past. [15]

MATERIAL AND METHODS

This cross-sectional study was conducted at Women medical college Abbottabad and Children hospital and the institute of child health, Multan, during from the period July, 2021 to Dec, 2021 and comprised of 55 patients. After receiving the patient's signed permission, demographic information was collected, which may have included the patient's age, gender, and body mass index (BMI). Those who had a previous diagnosis of myelomeningocele or TCS repair, as well as patients who did not provide informed consent, were not included in this research.

The ages of the patients ranged from 5 to 20 years. Patients who had myelomeningocele repair and TCS surgery were recruited in the study. It was determined how often patients suffered from leaks of cerebrospinal fluid. On a proforma, information such as the gender of the patient and the kind of procedure performed was written days after the first operation, along with any related infections, hydrocephalus, and the type of therapy. The management approach consisted of taking a conservative

approach by administering tincture benzoyl paste, replenishing the borders of the wound, and performing rework in the form of a ventriculoperitoneal shunt (VP) or the repair of the dural leaking site. The whole dataset was examined using version 22.0 of the SPSS programme. It was determined by using the mean and standard deviation. Tabulation form was used to capture both the frequencies and the percentages.

RESULTS

Among 55 cases, majority were males 32 (58.2%) and 23 (41.8%) were females.(fig 1)

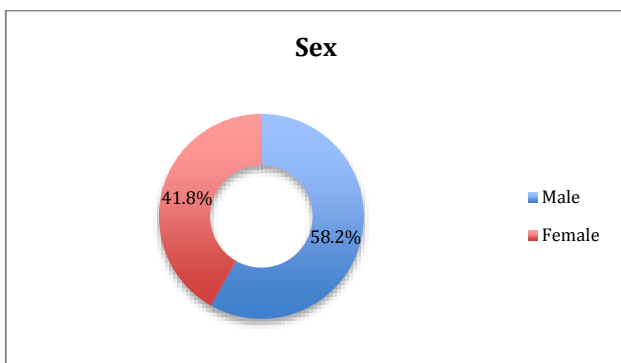


Figure-1: Gender distribution among all cases

Included patients had mean age 9.5±6.14 years. The mean duration of CSF leaks was 13.11±10.34 days. Frequency of CSF leak was found among 18 (32.7%) patients. Among 18 cases of CSF leaks 12 (66.7%) were males and 6 (33.3%) were females. (table 1)

Table 1: Age and frequency of CSF leak

Variables	Frequency	Percentage
Mean age (years)	9.5±6.14	
Mean Duration of CSF leak (days)	13.11±10.34	
CSF Leak		
Yes	18	32.7
No	37	67.3
Gender		
Men	12	66.7
Women	6	33.3

In 18 patients of CSF leaks, Frequency of MMC repair was 11, TCS release was found in 3 patients and meningocele repair in 4 patients. With the use of tincture benzoyl-enhanced primary wound healing in three patients with CSF leaks during surgery, the HCP postoperative signs were resolved. HCP was found in two further patients after their sutures mended with benzoyl tinctures, and they were placed in the shunt.(fig 2)

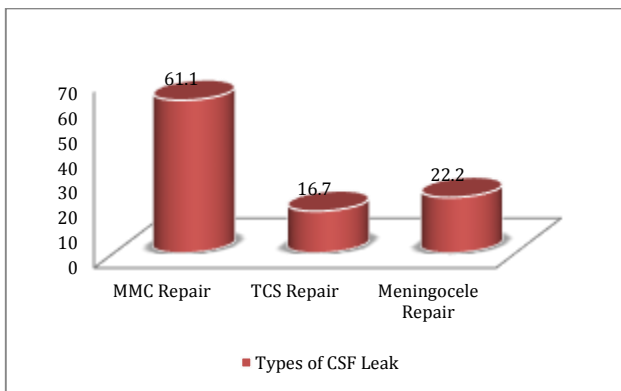


Figure 2: Postoperative CSF leak distribution based on repair techniques

DISCUSSION

The prevalence of spinal dysraphism varies greatly from country to country and area to region. A child's condition may be obvious at birth or obscure to the family; in developed countries, a consultation with a neurosurgeon is sought immediately after birth, and the children are operated on sooner; in developing countries like ours, however, patients are presented to neurosurgeons later and early surgery is not encouraged by surgeons because of the risks of anaesthesia, which are greater in developing countries. [16] Rhinorrhea or otorrhea are two possible symptoms of a leaking cerebral spinal fluid (CSF) in the skull. Except in cases when the tympanic membrane is faulty and leaks manifest as otorrhea, the leaks most often appear as rhinorrhea. Anteroposterior, middle, and posterior fossas are all possible locations for the communication point; the mastoid and middle ear air cells and the sphenoid air cells are all examples. For these abnormalities, the most probable cause is a traumatic event such as an automobile collision, particularly one with moderate to high-velocity damage. The most common symptom of a fractured skull base in those who have been in car accidents is CSF rhinorrhoea. [17]

In our study 55 patients were presented. Among 55 cases, majority were males 32 (58.2%) and 23 (41.8%) were females. Included patients had mean age 9.5±6.14 years. These findings were comparable to the studies conducted in past.[18,19] CSF leaks are common after spinal dysraphy surgery, with an incidence ranging from 8% to 30%. [20,21] The incidence of post-op CSF leakage in our research was 32.7 percent; many of these patients reacted to simple sutures of skin strengthening and tincture application of post-op benzoyl, and a study by Marino R also supported and approved the use of CSF leak tincture benzoyl. [22] The most recent version is now available. There are reports of allergic responses and contact dermatitis from using Benzoyl tincture on wounds, although Scardamaglia and other researchers have argued that benzoyl may not be the cause of any allergic reactions. [23]

In 18 patients of CSF leaks, Frequency of MMC repair was 11, TCS release was found in 3 patients and meningocele repair in 4 patients. With the use of tincture benzoyl-enhanced primary wound healing in three patients with CSF leaks during surgery, the HCP postoperative signs were resolved. HCP was found in two further patients after their sutures mended with benzoyl tinctures, and they were placed in the shunt. 25-30% of individuals with CSF leak develop meningitis as a result of the most prevalent side effect. A patient's risk is 50-60% greater if the leak develops slowly, as opposed to 5-10% in individuals who notice the leak right away. Patients with penetrating injuries are also more likely to suffer from this condition. Antibiotics have no established use in people with no clinical indication of meningococcal disease. [24] Empirical antibiotics must be administered to individuals who show signs of meningitis, followed by antibiotics depending on culture and sensitivity. Streptococcus pneumoniae and Hemophilus influenzae are the most frequent pathogens. [25]

Experiments have shown that growing pains and other symptoms in children may be traced to changes in the spinal canal's diameter, which in turn causes progressive damage to the spinal cord. There are accounts that demonstrate that the symptoms occur at two or four-year intervals, and at eight or ten-year intervals, but only once every five or nine years. A very low rate of myelomeningocele repair was seen in our group of hydrocephalus patients who had shunts placed either prior to or concurrently with their shunt placement. Skin flaps were also suggested to avoid C.S.F leakage. Hydrocephalus was found in 365 instances (88 percent) and all of them were removed. Following shunt installation, 17 incidences of necrotizing fasciitis have been documented (4 percent). Infections associated with shunt implantation included age, local scalp status, shunt operation time, prophylactic antibiotic usage, and overall patient health. A variety of things were determined to be the cause. [26]

Only three patients in our study needed expansile duraplasty because to persistent infections and leaks. Another consequence of spinal dysraphism is tying the rope, in which patients with neurological signs that develop adhesion at the repair site and subsequently, although such difficulties were perhaps not observed owing to the short follow-up time. [27] In this research, we found that patients with myelomeningocele and TCS repair had a higher incidence of CSF leakage. After skin reinforcement, these individuals may be treated with tincture benzoyl.

CONCLUSION

In this research, we found that CSF leaks are more common in patients having myelomeningocele and TCS repair. Skin-healing tincture benzoyl will help these people.

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