ORIGINAL ARTICLE

Management of Postoperative Pseudomeningocele following Posterior Cranial Fossa Surgery

IMRAN ALTAF,[1] ASIF SHABBIR,[2] ANJUM HABIB VOHRA[2]
Shahzad Shams[2]
Department of Neurosurgery, [1]Khawja Muhammad Safdar Medical College, Sialkot and
[2]PGMI / Lahore General Hospital, Lahore

ABSTRACT

Objective: *Pseudomeningoceles are common complications after posterior fossa surgery. Management guidelines are lacking, and radically different suggested treatments varying from observation to immediate surgical intervention are encountered in literature. The purpose of our study was to detail our experience in the management of pseudomeningocele following posterior fossa surgery.*

Methods: *A retrospective, single-center study was conducted on 137 patients who underwent elective posterior fossa surgery for a variety of diseases. Patients with post operative pseudomeningocele formation were initially treated with conservative measures including bed rest, head elevation, pressure dressing and CSF lumbar drainage. Surgical re-exploration and repair of the dural rent was done in case the pseudomeningocele didn't settle with these conservative measures. In patients having gross hydrocephalus on post-operative CT scan a VP (ventriculo-peritoneal) shunt was done in case the conservative measures failed.*

Results: *There were 8 (5.8%) cases of pseudomeningocele formation after posterior fossa surgery. The pseudomeningocele didn't settle with conservative measures in any case. Surgical re-exploration and repair of the dural rent lead to the settlement of pseudomeingocele in four cases. VP shunting for gross hydrocephalus on post operative CT lead to the settlement of the pseudomeningocele in the other four cases.*

Conclusion: *Although it has been stated in literature that most cases of pseudomeningocele settle with conservative treatment with only a few requiring surgical intervention, our findings were different with conservative measures failing to resolve the pseudomeningocele in all the cases. We believe that it would be beneficial to take an aggressive attitude toward this condition and to consider the possibility of early surgical intervention more seriously.*

Key Words: *Pseudomeningocele, Posterior cranial fossa surgery, Cerebrospinal fluid lumbar drainage.*

Abbreviations: *SOLs: Suboccipital Craniectomies for 4th Ventricle/Cerebellar. CP: Cerebellopontine. CSF: Cerebrospinal Fluid.*

INTRODUCTION

Pseudomeningocele is a common complication after posterior fossa surgery.[1-4] It may cause complications such as cosmetic deformities, positional headache, chronic meningitis, and/or impingement on vital structures resulting in neurological deficits.[5,6] The incidence of clinically relevant pseudomeningocele formation after posterior fossa surgery ranges from 4 – 23% in literature.[6-12]

Management guidelines are lacking, and different suggested treatments varying from observation to immediate surgical intervention are encountered in literature.[1,2,13] The usual treatment algorithm consists of initially starting with nonoperative measures including pressure dressing, bed rest, and lumbar spinal drainage.[5,14,15] In case these conservative measures fail

surgical intervention may be required.[1,15,16] Postoperative ventriculomegaly, however, portends failure of temporary cerebrospinal fluid diversion, and early consideration of shunting might be appropriate in such cases.[1,2] The purpose of our study was to detail our experience in the management of pseudomeningocoele following posterior fossa surgery.

MATERIALS AND METHODS

The study was a retrospective, single-center study conducted in the Department of Neurosurgery, Unit-1, Lahore General Hospital from November 1, 2012 to June 30, 2016. Patients of both sexes and all age groups operated for posterior fossa pathologies were included in the study. Post-operative pseudomeningocoele formation at any point in time was noted. Pseudomeningocele was defined as significant fluid collection present beneath the incision causing cosmetic deformity noted on follow-up postoperative physical examination. Solely radiographic pseudomeningoceles were excluded since these are small and asymptomatic, and do not require any intervention. Other complications were not considered in this study.

In case of pseudomeningocoele formation initially conservative measures were instituted in all the patients. These conservative measures included bed rest, head elevation, pressure dressing and CSF lumbar drainage. Surgical re-exploration and repair of the dural rent was done in case the pseudomeningocoele didn't settle with these conservative measures. In patients having gross hydrocephalus on post-operative CT scan a VP shunt was done in case the conservative measures failed. The development of meningitis at any point in time was also noted. The follow up of all the patients was of four months.

RESULTS

Patient demographics that were operated for posterior fossa pathologies in the Department of Neurosurgery, Unit-1, Lahore General Hospital from 01-11-2012 to 30-04-2016 are given in table 1. The different operative pathologies are given in table 2, and the different surgical approaches are given in table 3. Overall, pseudomeningocoele formed in 8 (5.8%) cases out of the 137 cases operated for posterior fossa pathologies. Pseudomeningocoele formed in 4/40 (10%) cases of retrosigmoid surgeries for Cerebellopontine (CP) Angle SOLs, and 4/61 (6.5%) cases of midline suboccipital craniectomies for 4th ventricle/cerebellar SOLs.

Table 1:

Patient Demographics			
Mean age (Range)		33.7 (5 – 69)	
Male		87 (63.5%)	
Female		50 (36.5%)	

Table 2:

Pathology	n (%)
4th ventricle/cerebellar SOLs	61 (44.5%)
Cerebellopontine (CP) Angle SOLs	40 (29.2%)
Foramen magnum SOLs	11 (8%)
Chiari malformations	6 (4.4%)
Trigeminal neuralgia	19 (13.9%)

Table 3:

Approach	n (%)
Posterior midline suboccipital approach	78 (57%)
Suboccipital retrosigmoid approach	59 (43%)

In all the eight cases of pseudomeningocoele formation conservative measures including bed rest, pressure dressing and CSF lumbar spinal drainage were instituted. However, the pseudomeningocoele did not settle with these measures in any case. Four of these patients had developed hydrocephalus on postoperative CT scan. A VP shunt was done in these patients, and the pseudomeningocoele settled in these four patients. In the remaining four patients a surgical re-exploration was carried out. A dural rent was found in all the cases that was repaired with duroplasty by application of a graft taken from the pericranium. The pseudomeningocoele also settled in these four patients. All these eight patients were later on discharged in stable condition.

Three of the eight patients presenting with pseudomeningocoele developed meningitis. With CSF lumbar drainage and antibiotics the meningitis improved but the pseudomeningocoele didn't decrease in size. A VP shunt was done in these three patients once the meningitis had settled, as they had developed gross hydrocephalus on post-operative CT scans.

DISCUSSION

Posterior fossa surgery traditionally implies use of a craniectomy, in other words: permanent bone removal, without any type of bone replacement. Pseudomeningoceles are one of the most frequent complications of a craniectomy.[17] Pseudomeningoceles may cause complications such as cosmetic deformities, debilitating symptoms such as positional headache, chronic meningitis, impingement on vital structures with neurological deficits,[5,6] significant diminishing of benefits of suboccipital decompression for Chiari Malformation related symptoms[4],and rarely reported complications such as spontaneous intracerebellar migration of a pseudomeningocele[18] and posterior fossa cyst formation with brain stem compression.[5]

Its management can be challenging and treatment options vary in literature, and there is no consensus on the optimal management strategy.[1,2,13] As management guidelines are lacking so an international survey was carried out and opinions from neurosurgeons throughout the world were sought on the topic of management of pseudomeningocele after posterior fossa surgery. It was found that pseudomeningoceles after posterior fossa tumor resection, in the absence of hydrocephalus, were typically managed nonoperatively for 7 to 14 days before re-exploration. Only 0.5% of the surgeons would offer upfront repair of the pseudomeningocele. In the presence of hydrocephalus, 48% of the neurosurgeons intervene initially with cerebrospinal fluid (CSF) diversion and would change therapy if the lesion did not resolve in 2 to 4 days. It was concluded in this international survey that initial observation is appropriate for cranial pseudomeningoceles. Operative revision should be reserved for failure of conservative treatment.[1] This also is the usual treatment regimen followed and nonoperative measures like pressure dressing, bed rest and CSF lumbar drainage lead to the settlement of pseudomeningocoeles in the majority of cases.[14,15] In case of post operative ventriculomegaly CSF shunting may be required as ventriculomegaly portends failure of CSF lumbar drainage.[1,2]

In our study the incidence of pseudomeningocoele was 5.8% which falls within the range of 4 – 23% stated in literature. However, what was surprising was the fact that conservative measures failed to resolve the pseudomeningocoele in all the eight cases that it was employed in. Dural rent repair, and in case of hydrocephalus VP shunting led to the settlement of pseudomeningocoele. Our findings are thus similar to the findings of Jito et al[16] where all the three cases of pseudomeningocoele required surgical repair of the CSF fistula. We thus reach the conclusion that it would be beneficial to take an aggressive attitude toward this condition and to consider the possibility of early surgical intervention more seriously.

CONCLUSION

Although it has been stated in literature that most cases of pseudomeningocele settle with conservative treatment with only a few requiring surgical intervention, our findings were different with conservative measures failing to resolve the pseudomeningocele in all the cases. We believe that it would be beneficial to take an aggressive attitude toward this condition and to consider the possibility of early surgical intervention more seriously.

Address for Correspondence:
Dr. Imran Altaf
Department of Neurosurgery, Khawja Muhammad Safdar Medical College, Sialkot
E-mail: drimr2@hotmail.com

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AUTHORS DATA

Name	Post	Institution	E-mail	Role of Authors
Dr. Imran Altaf	Assistant Professor	Department of Neurosurgery, Khawja Muhammad Safdar Medical College, Sialkot	drimr2@hotmail.com	Paper Writing
Dr. Asif Shabbir	Assistant Professor	Department of Neurosurgery, PGMI / Lahore General Hospital, Lahore		Data Collection
Dr. Anjum Habib Vohra	Professor			Overall Supervision
Dr. Shahzad Shams	Professor			