



IMAGING OF INTRACRANIAL HYPOTENSION WITH PSEUDOMENINGOCELE – IN POST OPERATIVE CASE OF DISCECTOMY- A CASE REPORT STUDY

Radiodiagnosis

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ABSTRACT

Pseudomeningocele is a rare complication of spinal surgery & trauma. Post-spinal surgery patient presented features of meningitis - altered sensorium, neck stiffness, headache, fever which was treated conservatively and patient relieved of symptoms of meningitis, however patient had persistent headache & gait disturbance, so reimaging with contrast MRI of brain & spine revealed features suggesting intracranial hypotension & pseudomeningocele at post operative site which was confirmed with CT myelography. Hence, contrast CT myelography / cisternography helps in confirmation of pseudomeningocele and is considered as gold standard. Reappearance of non-specific neurological symptoms in a previously operated patient of spine surgery needs careful evaluation & intracranial hypotension or pseudomeningocele can be considered as differential diagnosis. Early diagnosis of this entity helps to treat the patient accordingly.

KEYWORDS

Pseudomeningocele; Cisternography; Durotomy; Laminectomy.

INTRODUCTION :

Pseudomeningocele is a rare complication of an unintended durotomy during spinal surgery and the lumbar spine has a higher intraspinal pressure in erect posture, and hence there is a greater incidence of pseudomeningocele formation (1). Hyndman and Gerber in 1946 was first described the post-laminectomy pseudomeningocele (3). The incidence of post operative pseudomeningocele in lumbar laminectomy patients varies from 0.07% to 2% according to studies by Swanson (4) and Teplick (5), respectively.

CASE REPORT

A 52 year old female patient operated for L4-L5 prolapsed disc, on 10th post operative day patient presented with sudden onset of altered sensorium, neck stiffness, headache, fever & reported for imaging with suspected meningitis / operative site infection.

On imaging non contrast CT brain showed cerebral oedema and MRI of LS- spine showed post operative changes at L4-5 level with no obvious post operative collection. CSF analysis yielded positive bacterial growth confirming acute meningitis. Patient was managed conservatively with appropriate antibiotics and patient recovered from meningitis. However patient had persistent & progressive headache and gait imbalance, reimaging was done with contrast MRI of brain & spine on 20th post-operative day which showed features of pseudomeningocele at operative site & signs of intracranial hypotension and pseudomeningocele was confirmed by CT - cisternography.

Ct- Cisternography Procedure: 5 ml of non-ionic iodinated contrast is injected into the spinal canal by 24 G spinal needle at L2-3 level under CT guidance. 1mm thin sections of area of interest were obtained immediately and after 5 minutes using multidetector 16 slice CT scanner (SIEMENS).

RESULTS

A. Contrast Mri Of Brain & Spine:

BRAIN findings:

Diffuse bilateral symmetrical patchy meningeal enhancement, minimal bilateral subdural hygroma in fronto-parietal regions (Left> Right). Reduced mamillo-pontine distance ~3.5mm (normal >5.5 mm) and mild tonsillar decent – All features suggesting intracranial hypotension.

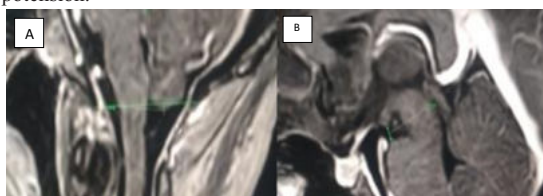


Figure 1. Post Contrast Sagittal Sections T1W MRI Image Of Brain -A) Mild Tonsillar Decent, B) Reduced

Mamillo-pontine Distance (~3.5mm) Suggesting Intracranial Hypotension.

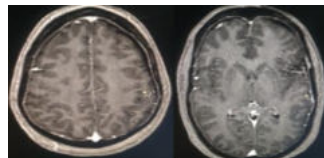


Figure 2: C, D-Post contrast axial sections T1W image of MRI brain -Diffuse bilateral symmetrical patchy meningeal enhancement & minimal bilateral subdural hygroma in fronto-parietal regions (Left> Right).

SPINE FINDINGS:

A well defined CSF intensity (Hyperintense on T2w2& hypointense on T1W images) collection measuring 3.5x5.0x 7.0 cm) at the postoperative site with suspicious communication with underlying subarachnoid space suggesting pseudomeningocele.

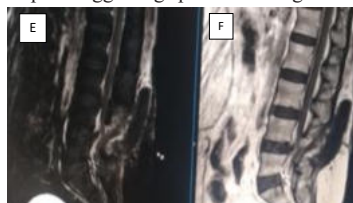


Figure 3 : Sagittal Sections T1wi Of Mri Ls Spine – E (Post Contrast Fat Sat T1wi), F (t1wi) Csf Intensity Collection Over Postoperative Site With Suspicious Communication With Underlying Subarachnoid Space - Pseudomeningocele

B. CT Cisternography Findings:

The iodine contrast from the subarachnoid space leaked into the midline subcutaneous collection (measuring 3.6x 5.0 x 7.0 cm) at the post operative site at L4-L5 level showing clear communication with spinal subarachnoid space by dural defect of 5.5 x 4.5mm size confirming Pseudomeningocele.

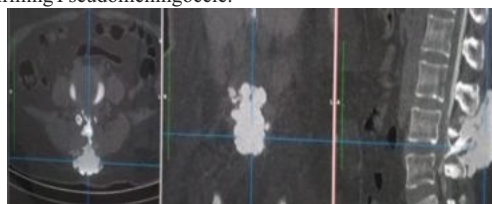


Figure 4: CT cisternography: G) Midline subcutaneous contrast opacified collection (3.6x 5.0 x 7.0 cm) at L4-L5 level (Post operative site) which is communicating with spinal subarachnoid space by dural defect of 5.5 x 4.5mm -Pseudo-meningocele.

DISCUSSION:

During lumbar disc surgery very small unintended dural tears can happen (9). If dural tears are not noticed during the operation and in most cases it closes spontaneously with the help of Fibrosis and in some cases possible consequence are constant leakage of cerebrospinal fluid with resultant intracranial hypotension syndrome and pseudomeningocele (2). The tear of both the dural and arachnoid layers results in extravasation of cerebrospinal fluid in the para-spinal tissue and if tear limited to the dural layer with intact arachnoid layer, the cerebrospinal fluid (CSF) collects in the extradural space and CSF accumulation is subject to a ball valve phenomenon with resultant formation of an extradural cyst. The extravasation of CSF may also result in herniation of nerve roots in the pseudo cyst cavity(1).

Pseudomeningocele causes signs and symptoms due to mass effect exerted over neural structures and usually presents with low back pain which is exacerbated on sneezing and coughing. Patients may also present with radicular symptoms in event of herniation of nerve roots in the cyst cavity. Rarely motor deficits and sphincter dysfunction may be present. Koo et al.(6) in 1986 and James et al.(7) in 1996 reported a delayed infection of pseudomeningocele.

In most cases a leakage of cerebrospinal fluid in the operational site can be demonstrated by conventional MRI scan (9). Contrast CT myelography / cisternography helps in confirmation. Pseudomeningocele follows the CSF signal intensity in all sequences appearing hypointense on T1WI & hyperintense on T2WI. The size of the pseudomeningocele depends on the size of the dural tear and also on the level of incidental durotomy. If the size of the lesion is ≥ 8 cm in diameter is referred as Giant pseudomeningocele (8).

The small asymptomatic pseudomeningocele are periodically monitored and are managed conservatively (3), whereas the symptomatic, large pseudomeningocele are managed with surgery. Exploration of pseudomeningocele sac with repair of durotomy and post-operative subarachnoid drain remains the standard treatment. In case if nerve roots are present within the pseudomeningocele and they need to be repositioned inside dural cavity.

In the present reported case after recovering from meningitis symptoms by appropriate antibiotics, patient had persistent symptoms & progressive headache and gait imbalance. The correlation of contrast MRI findings and CT cisternography has allowed the accurate diagnosis of the presence of intracranial hypotension syndrome & pseudomeningocele later patient was managed appropriately with surgical closer of dural defect.

CONCLUSION:

The reappearance of non-specific neurological symptoms in a previously operated patient of spine surgery needs careful evaluation and intracranial hypotension or pseudomeningocele can be considered as differential diagnosis. CT cisternography is the gold standard imaging modality in diagnosis of a pseudomeningocele and it can depict the pseudo-meningocele clearly by showing communication with subarachnoid space. Early diagnosis of this entity helps to treat the patient accordingly.

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