Spinal arachnoiditis

Spinal adhesive arachnoiditis (SAA) is an inflammatory process of the meninges. Cystic changes and cicatrisation may lead to neurological deficits and immobilization. Therapy is difficult and often unsatisfactory.

Etiology

Many putative “risk factors” have been described for the development of arachnoiditis, including:

1. spinal anesthesia: either due to the anesthetic agents or to detergent contaminants on the syringes used for same

2. spinal meningitis: pyogenic, syphilitic, tuberculous

3. neoplasms

4. Intrathecal contrast agents: less common with currently available nonionic water soluble contrast agents

5. trauma

a) post-surgical: especially after multiple operations

b) external trauma

6. hemorrhage

7. idiopathic

Intrathecal steroids

Lumboperitoneal shunt

Spinal dermal sinus.

Diagnosis

It is critical to differentiate residual/recurrent disc herniation from scar tissue and adhesive arachnoiditis as surgical treatment has generally poor results with the latter two.

Radiographic findings in arachnoiditis

NB: Radiographic evidence of arachnoiditis may also be found in asymptomatic patients.

Arachnoiditis must be differentiated from tumor: the central adhesive type may resemble CSF seeding of tumor, and myelographic block may mimic intrathecal tumor.

MRI

3 patterns on MRI:

1. central adhesion of the nerve roots into 1 or 2 central “cords”

2. “empty thecal sac” pattern: roots adhere to meninges around periphery, only CSF signal is visible intrathecally

3. thecal sac filled with inflammatory tissue, no CSF signal. Corresponds with myelographic block and candle-dripping appearance

Enhancement: acute arachnoiditis may enhance. Chronic arachnoiditis usually does not enhance with gadolinium as much as e.g. tumor.

Myelogram

May demonstrate complete block, or clumping of nerve roots.

Myelography (especially with post-myelographic CT) is very capable of demonstrating arachnoiditis.

Complications

Failed back surgery syndrome.

Myelitis.

Coccydynia…

Treatment

Includes: short-term bed rest, analgesics (non-narcotic in most cases), antiinflammatory medication (non-steroidal, and occasionally a short course of steroids), and physical therapy.

Surgery for carefully selected patients with arachnoiditis (those with mild radiographic involvement,

and < 3 previous back operations) has met with moderate success (although in this series, no patient returned to work). Approximate success rate in other series: 50% failure, 20% able to work but with symptoms, 10–19% with no symptoms. Surgery consists of removal of extradural scar enveloping the thecal sac, removing any herniated disc fragments, and performing foraminotomies when indicated. Intradural lysis of adhesions is not indicated since no means for preventing reformation of scar has been identified.

Case series

Krätzig et al., describe eight cases of extensive SAA following extradural spinal infection.

238 patients with epidural abscess or osteomyelitis were treated at the University Medical Center Hamburg-Eppendorf, Hamburg, Germany between 2011 and 2018. They identified eight patients who developed extensive SAA on follow-up. Different forms of the disease, radiological changes and potential treatment options are described.

Eight patients developed extensive SAA after either spontaneous epidural infection in four cases (50%), or following surgery or steroid injection (50%). Initial treatment for epidural infection was surgery without dural injury in 87.5%. One patient was treated conservatively. SAA was diagnosed one month to eight years after the initial infection, not only in the index region but throughout the whole spine, with varying clinical symptoms. Treatment options such as corticosteroids (n=4), thecaloscopy (n=1), syringe-subarachnoid shunting (n=1) and focal or multilevel arachnolysis (n=5) were applied. In two cases (25%) a rare complication of internal malabsorptive hydrocephalus had to be treated. Patients showed diverse outcomes at last follow-up (mean: 37 months).

The prognosis for extensive SAA is poor. Surgical interventions may improve radiological findings and clinical presentation at least temporarily. Even extradural infection can lead to severe SAA. Early surgery with local reduction of the epidural infection might reduce the risk of inflammation passing the dural sac causing SAA [1)].

A patient followed in the outpatient spinal cord injury support clinic at a VA Medical Center with a prior remote history of a gunshot wound to the back and multiple prior myelograms presented with a recurrent waxing and waning weakness of the left lower extremity and intermittent incontinence of bowel and bladder. Findings: During the evaluation, the patient experienced an immediate albeit temporary improvement in symptoms after a diagnostic lumbar puncture performed for CT myelogram. The symptoms of myelopathy reoccurred several weeks, but then the patient had a similar experience with rapid improvement in symptoms after an accidental fall down a flight of steps. Subsequently, the foot weakness and incontinence returned one week later. The patient ultimately developed permanent improvement in signs and symptoms after surgical intervention which included intradural lysis of adhesions, incision of the arachnoid membrane and resection of a cystic lesion. Clinical relevance: Patients who experience unexpected, albeit transient improvement in myelopathic symptoms who are known or suspected to have arachnoiditis should be evaluated for surgically remediable lesions. Remediation of these lesions can potentially improve long term outcome. [2)].

2013

A case of arachnoiditis following caudal epidural injection with steroid for lumbar radiculopathy. The patient presented with contralateral sciatica, worsening low back pain and urinary retention few days following the injection, followed by worsening motor functions in L4/L5/S1 myotomes with resultant dense foot drop. Gadolinium-enhanced magnetic resonance imaging suggested infective arachnoiditis with diffuse enhancement and clumping of the nerve roots within the lumbar and sacral thecal sac. As the number of injections in the management of back pain and lumbo-sacral radicular pain is increasing annually, it is imperative to have a thorough understanding of this potentially dangerous complication and educate the patients appropriately [3].

1)
Krätzig T, Dreimann M, Mende KC, Königs I, Westphal M, Eicker SO. Extensive spinal adhesive arachnoiditis after extradural spinal infection - spinal dura mater is no barrier to inflammation. World Neurosurg. 2018 Jun 5. pii: S1878-8750(18)31173-2. doi: 10.1016/j.wneu.2018.05.219. [Epub ahead of print] PubMed PMID: 29883820.
2)
Jahja E, Sansur C, Gorman PH. Spinal arachnoiditis leading to recurrent reversible myelopathy: A case report. J Spinal Cord Med. 2020 Nov 9:1-4. doi: 10.1080/10790268.2020.1830250. Epub ahead of print. PMID: 33166210.
3)
Nanjayan SK, Swamy GN, Yallappa S, Bommireddy R. Arachnoiditis following caudal epidural injections for the lumbo-sacral radicular pain. Asian Spine J. 2013 Dec;7(4):355-8. doi: 10.4184/asj.2013.7.4.355. Epub 2013 Nov 28. PubMed PMID: 24353855; PubMed Central PMCID: PMC3863664.