

1. Subarachnoid cysts
2. Syringomyelia
3. Communicating hydrocephalus

1. Subarachnoid (arachnoid) cysts: These are a recognised complication of arachnoiditis, in particular that caused by myelographic dyes or epidural anaesthesia. (

[\[1\]](#)

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[\[2\]](#)

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They tend to be more common in the thoracic region than cervical or lumbar.

Kendall et al ([\[3\]](#)) stated that the incidence of cysts at myelography, as incidental findings, is relatively common, but rarely of clinical significance.

In symptomatic cases, clinical presentation is generally non-specific, although there may be a sensory level, which is not a finding in uncomplicated arachnoiditis.

Symptoms tend to be intermittent and may occur with postural changes or Valsalva manoeuvres (e.g. straining to empty the bowel). 30% of patients may have intermittent periods of remission but the majority of episodes tend to progressively worsen over time.

Surgical excision or drainage is often successful, provided that there is early intervention.

2. Syringomyelia: Whilst an uncommon sequela to arachnoiditis, syringomyelia should nevertheless be considered as a possible complication. Indeed, Kamada et al (

[\[4\]](#)

) recommend follow-up serial MRI imaging for patients with adhesive arachnoiditis in order to detect syringomyelia as early as possible.

Syrinx formation tends to occur in the segment of spinal cord adjacent to the area affected by arachnoiditis. It then starts to expand, due to pressure differences along the spine causing the fluid to move within the cavity. This is sometimes referred to as non-communicating syringomyelia.

The primary symptom of syringomyelia is pain, which may spread upward from the site of original pathology (the arachnoiditis lesion). Neurological deficit tends to be in a "cape-like" distribution in the upper part of the body. Increased levels of pain, increased spasticity and decreased physical function are often early indicators of syrinx development.

The principle features of syringomyelia are:

- Headache- worsens with cough, sneeze, and strain.
- Neckache
- Pain in upper limbs, often exacerbated by valsalva manoeuvres, exertion or coughing.
- Areas of dissociated sensory loss, which may be in a bizarre distribution over the trunk and upper limbs.
 - Loss of temperature sensation in upper limbs may lead to painless burns.
 - Loss of upper limb reflexes; positive Babinski reflex
 - Atrophy (wasting) of small muscles in the hands
 - Spastic paresis, gradually progressive, leading to difficulty in walking. (increased muscle tone and weakness)
 - Uncoordinated movements
 - Muscle spasms and fasciculations
 - Skin rashes
 - Alteration in sweating
 - Raynaud's phenomenon (cold, painful hands due to poor circulation)
 - Horner's syndrome (see above), nystagmus.
 - Dysphagia (difficulty swallowing)
 - Dysphonia (abnormal voice)
 - Abnormal salivation.

(NB. These symptoms are sometimes seen in uncomplicated arachnoiditis. Jenik et al., stated that spinal cord syndromes due to non-traumatic adhesive arachnoiditis cause "predominantly syringomyelic sensory deficits.")

Later stages may affect bladder, bowel and sexual function.

Joint pains worse with straining.

Charcot Joints (neurogenic arthropathy= joint damage due to lack of protective sensation)

Symptoms may be unilateral or bilateral.

An uncommon finding is onset of electric shock sensation running up and down the spine when the head is flexed or extended, occasionally followed by syncope (passing out). This is known as Lhermitte's phenomenon.

Some patients may show an increasing scoliosis (lateral curvature of the spine) which is thought to be due to unequal nerve supply to the paraspinal muscles.

- Misdiagnoses have included:

Carpal tunnel syndrome (neurological symptoms resulting from compression of the median nerve at the wrist)

- Ulnar nerve compression (ulnar nerve in the arm)
- Cervical spondylosis (degenerative disease of the cervical spine).

Hydrocephalus: This is a rare complication, details of which are beyond the scope of this article. It tends to be of the communicating type.

Normal pressure hydrocephalus (NPH) is an accumulation of cerebrospinal fluid (CSF), which causes the ventricles of the brain to enlarge.

This may not cause the increased intracranial pressure, seen with most types of hydrocephalus, but the abnormal accumulation of CSF is thought to stretch the nerve tissue of the brain causing a triad of symptoms.

Normal pressure hydrocephalus is a misleading term because CSF pressure may fluctuate from high to normal to low.

Medical literature on hydrocephalus secondary to arachnoiditis is scant, but there are isolated reports. One of these ([\[5\]](#)) describes a case in which a combination of aseptic meningitis, arachnoiditis, communicating hydrocephalus and Guillain-Barre syndrome followed metrizamide myelography.

Other causes include cranial surgery, subarachnoid haemorrhage, meningitis, tumour or cysts, subdural haematoma, bleeding during surgery and infections.

Poon et al. ([\[6\]](#)) recently reported on a case of spinal tuberculous arachnoiditis (thoracic) presenting with acute hydrocephalus presenting with confusion and fever, who needed treatment by shunting.

Moling et al. ([\[7\]](#)) reported on a case of 14 months of chronic meningitis, ventriculitis, choroid plexitis, and lumbar arachnoiditis, complicated by acute hydrocephalus.

Aspergillus organism was isolated from the cerebrospinal fluid of the patient, who had been a previously healthy man.

Uefuji ([\[8\]](#)) has described the case of a woman who had spinal anaesthesia for knee surgery and subsequently developed cauda equina inflammation and after 2 months, hydrocephalus and thoracolumbar arachnoiditis.

Sotelo et al., ([\[9\]](#)) from the National Institute of Neurology and Neurosurgery in Mexico City,

have classified various forms of cystercicosis involving the brain, including active forms (ongoing infections) with meningeal irritation.

In these cases there are increased mononuclear cells, protein in the CSF and positive CSF serology tests against cysticerici.

Arachnoiditis is listed as one form and

"meningeal irritation with hydrocephalus"

as the second. (there are also various cystic forms).

The authors cited a 3.8% incidence of hydrocephalus in their series of 753 cases of neurocystercicosis, and 48.2% incidence of arachnoiditis.

Symptoms of NPH

Normal pressure hydrocephalus has a presentation similar to that of dementia, Alzheimer's disease, or other neurological disorders such as Parkinson's syndrome.

NPH normally occurs in adults 60-years and older, and in as many as 10% of all patients with symptoms of dementia.

Characteristic symptoms of normal pressure hydrocephalus are stuttering walk, urinary incontinence, ataxia and first traces of dementia and memory loss.

Gait: mild imbalance can result in an inability to stand or walk; there may be a wide-based gait, with shuffling, short, slow steps. There is often trouble picking up the feet, which can lead to tripping. This tends to be the most pronounced and first apparent symptom.

Mild dementia: may manifest as a loss of interest in daily activities, forgetfulness, difficulty with routine tasks, short-term memory loss.

Impaired bladder control: urinary frequency and urgency may result in complete loss of control; there is a strong immediate urge to void; faecal incontinence may rarely occur.

[1] Torres D, Bauso Toselli L, Vecchi E, Leiguarda R, Doctorovich D, Merello M, Guevara J, Nogues M *Medecina (B Aires)* 1993;53(50):391-396 [Spinal arachnoiditis as a complication of peridural anesthesia]

[2] Tseng SH, Lin SM *Clin Neurol Neurosurg* 1997 Dec; 99(4): 256-8 Surgical treatment of thoracic arachnoiditis with multiple subarachnoid cysts caused by epidural anesthesia.

[3] Kendall BE, Valentine AR, Keis B, *Neuroradiology* 1982 Spinal arachnoid cysts: clinical and radiological correlation with prognosis.

[4] Kamada K, Iwasaki Y, Hida K, Abe H, Isu T *No Shinkei Geka* 1993 Feb;21(2):135-140 [Syringomyelia secondary to adhesive arachnoiditis: clinical profiles and efficacy of shunt operations]

[5] Kelley RE, Daroff RB, Sheremata WA, McCormick JR *Arch Neurol* 1980 Sep; 37(9): 588-9 Unusual effects of metrizamide lumbar myelography. Constellation of aseptic meningitis, arachnoiditis, communicating hydrocephalus, and Guillaine-Barre syndrome.

[6] [Poon TL](#), [Ho WS](#), [Pang KY](#), [Wong CK](#). *Hong Kong Med J*. 2003 Feb; 9(1):59-61. Tuberculous meningitis with spinal tuberculous arachnoiditis.

[7] [Moling O](#), [Lass-Floerl C](#), [Verweij PE](#), [Porte M](#), [Boiron P](#), [Prugger M](#), [Gebert U](#), [Corradini R](#), [Vedovelli C](#), [Rimenti G](#), [Mian P](#). *Mycoses*. 2002 Dec; 45(11-12):504-11. Case Reports. Chronic and acute Aspergillus meningitis.

[8] [Uefuji T](#). *Masui*. 1999 Feb; 48(2):176-80. [Persistent neurological deficit and adhesive arachnoiditis following spinal anesthesia with bupivacaine containing preservatives]

[9] Sotelo J Guerrero V Rubio F. *Arch Intern Med*. 1985; 145 442 Neurocysticercosis: A new classification based on active and inactive forms.