Delayed shunt insufficiency diagnosis

Delayed shunt insufficiency is diagnosed through a combination of clinical assessment and imaging studies:

Clinical Evaluation

History and Physical Examination: A thorough assessment of symptoms, including their onset, duration, and progression.

Neurological Examination

To detect signs of increased ICP or other neurological deficits.

Imaging Studies

CT or MRI scans to assess the size of the ventricles and the placement of the shunt.

Shunt Series X-rays: To check for disconnections or breaks in the shunt system.

Shunt Tap: Involves accessing the shunt to measure pressure and check for infections.

Dynamic plain abdominal radiography

Many ventriculoperitoneal shunt complications may occur after ventriculoperitoneal shunt placement for hydrocephalus, and delayed shunt insufficiency (DSI) is among the most common. It is often caused by abdominal adhesions, which increases the difficulty of diagnosis.

A study of Department of Neurosurgery, Sanbo Brain Hospital aimed to explore the clinical value of dynamic plain abdominal radiography (DPAR) as a simple diagnostic method for patients with DSI due to terminal adhesion of the peritoneal catheter after ventriculoperitoneal shunt.

A total of 30 patients with high suspicion of DSI due to abdominal adhesions after VP surgery were included. DPAR was used for prospective assessment. The interval between the first and second PAR was 4-6 h before surgery. If two plain abdominal radiography at different times indicated that the end of the shunt tube in the abdominal segment was fixed, it was diagnosed as DSI due to adhesion of the shunt tube at the abdominal end. The peritoneal end of the shunt tube was surgically repositioned. Postoperative DPAR was repeated to evaluate the distance of the shunt outlet within the abdominal segment.

All cases showed clinical symptoms or imaging findings of shunt insufficiency. The diagnostic

accuracy of DPAR was 96.67% (29/30). The end of the shunt tube in the abdominal segment of the preoperative group was fixed with abdominal plain film twice with a mean difference of 1.74 ± 1.18 cm. The mean postoperative change in the position of the end of the shunt tube in the abdominal section was 9.36 ± 2.64 cm, showing a significant difference compared with the preoperative group ($P < 0.001$). The mean postoperative EVANs index (0.37 ± 0.08) was significantly lower than the preoperative (0.42 ± 0.08) ($P = 0.007$), Glasgow coma scale score (12.8 ± 2.69) was higher than the mean preoperative score (11.36 ± 2.43) ($P = 0.013$).

DPAR is a simple and effective method for shunt insufficiency diagnosis caused by delayed abdominal end adhesion after VP shunt [1)]

Pressure Monitoring

Intracranial Pressure Monitoring: Continuous monitoring may be necessary in ambiguous cases to assess the pressure dynamics. Shuntogram or Radionuclide Study:

Shuntogram

A contrast study to evaluate the flow of CSF through the shunt system.

Radionuclide Study

Radionuclide Study: Can assess the flow and clearance of CSF through the shunt.

1)
Liu Z, Chen J, Weng C, Liu B, Lin Z. Dynamic plain abdominal film provides simple and effective diagnosis of delayed shunt insufficiency caused by abdominal adhesions after VP shunt. Chin Neurosurg J. 2024 Sep 3;10(1):26. doi: 10.1186/s41016-024-00378-z. PMID: 39228004.