Needle fracture—a rare complication to spinal anaesthesia

An overweight but otherwise healthy patient underwent knee arthroscopy using spinal anaesthesia. During retraction of the needle it fractured leaving behind two fragments. There were no neurological symptoms or pain. One of the fragments was removed surgically with fluoroscopy guidance. The other fragment was not found.

Imaging Findings:

Conventional X-ray of the lumbar spine (frontal view) showed two retained needle fragments posterior to the vertebral body of L2 and medially to the right pedicule (Figure 1a). On the lateral view the needle fragments can be seen under the spinosus process of L1 (Figure 1b).

Ultrasound was performed but failed to locate the retained needles.

MRI visualised the needle fragments as artefacts to the right at the L1/L2 level (Figure 2). There were no indications of epidural haematoma or nerve compression.

As MRI showed artefacts but not the needle fragments, CT from level L1-L3 was performed to identify the exact location of the needle fragments (Figure 3). CT showed the two fragments in the space between the spinosus process of L1 and L2. One fragment had the tip in the right ligamentum flavum between L1 and L2. The other fragment was in the subcutaneous fat.

Discussion:

Needle fracture is a rare complication to spinal anaesthesia. The complication was first reported in 1929 [1]. Since then there have been multiple reports of broken spinal needles [2–12]. Needle fracture may be dangerous because of the risk of nerve damage, needle migration, infection and granuloma formation [13–16]. However, none of the patients in the previously published case reports had any sequelae.

Two questions are raised in relation to this complication: 1) Why does the needle fracture? and 2) What imaging procedures should be performed?

Regarding the first question, some risk factors to needle fracture have been suggested:

1. Several puncture attempts with the same needle resulting in weakness of the needle material. Redirecting is often necessary in obese patients with high BMI [8].

2. Needle length and diameter [8, 17]. Fine needles are often used because they reduce the amount of the CSF...
leak, thus decreasing the risk of post dural headache - the most common complication of spinal anaesthesia. However, the consequence is an increased risk of needle deformation, bending and fracture.

3. Bone contact with the spinal needle [2–4] and anatomic anomalies of the vertebral column [18].

Regarding the second question, it seems that CT is the best imaging modality to locate needle fragments. With multi-planar reconstructions it is possible to determine the exact location of all needle fragments and the relation to the important structures of the spine.

Conventional X-ray can be performed to get an overview of the location of the fragments. If location near the spinal cord can be excluded, ultrasound can be performed to look for fragments in the superficial soft tissues. MRI is not a good option because plastic fragments induce susceptibility artefacts.

In the present case, both conventional X-ray, ultrasound, MRI and CT was performed. Our case illustrates that CT is the best imaging modality to determine the location of fractured spinal needles.

**Differential Diagnosis List:** Needle fracture during spinal anaesthesia, Spinal fracture, Other foreign body

**Final Diagnosis:** Needle fracture during spinal anaesthesia

**References:**

Description: Conventional X-ray (frontal view) shows two needle fragments (arrows) posterior to the vertebral body of L2 and medially to the right pedicule. Origin: Dept. of Radiology. Copenhagen University Hospital Herlev, Denmark
Description: Conventional X-ray (lateral view) shows the needle fragments (arrows) under the spinous process of L1. Origin: Dept. of Radiology, Copenhagen University Hospital Herlev, Denmark
Description: Sagittal unenhanced T1 weighted MRI shows the needle fragments as artefacts to the right at the L1/L2 level (arrows). Origin: Dept. of Radiology. Copenhagen University Hospital Herlev, Denmark
Description: Sagittal unenhanced T2 weighted MRI shows the needle fragments as artefacts to the right at the L1/L2 level (arrows). Origin: Dept. of Radiology. Copenhagen University Hospital Herlev, Denmark
**Description:** Sagittal unenhanced T2 weighted MRI shows the needle fragments with no nerve root compression (arrows). **Origin:** Dept. of Radiology. Copenhagen University Hospital Herlev, Denmark
Description: Sagittal unenhanced CT shows the two fragments in the space between the spinous process of L1 and L2 (arrows). Origin: Dept. of Radiology. Copenhagen University Hospital Herlev, Denmark
Description: Axial unenhanced CT shows the long fragment with the tip in the right ligamentum flavum between L1 and L2 (arrow). **Origin:** Dept. of Radiology. Copenhagen University Hospital Herlev, Denmark