# The broken epidural catheter: to remove or not to remove?

An epidural catheter breaking in a patient rarely occurs nowadays, with data suggesting an incidence of 1 in 60 000 (0.002%)(Collier, 2000). This low incidence reflects advances in catheter construction and use of more robust synthetic polyamides such as nylon. Nonetheless there are still reports in the medical literature describing catheters breaking within patients (Drake, 2012). The exact aetiology of this is still unclear but a number of mechanisms have been suggested based on experimental models, including:

- Shearing of the catheter by removing it without also withdrawing the epidural needle
- Kinking or knotting of the catheter during insertion and shearing by continued advancement of the epidural needle
- Entrapment of the catheter by ligaments, neural and bony structures with breakage on attempted removal (Collier, 2000).

The management of this problem is controversial, but the ultimate question comes down to whether the risks of leaving a retained fragment of catheter outweigh those of surgically removing it.

## The fragment should not be removed surgically

All the major manufacturers indicate that their epidural catheters are sterile and inert so, if inserted aseptically, retained catheter fragments are extremely unlikely to cause any neurological sequelae or pose an infection risk. There is little in the medical literature to suggest that removing such fragments is beneficial to the asymptomatic patient (Mitra and Fleischmann, 2007). This is further supported by local neurosurgical opinion. Spinal surgery is not without risks and in the worse case scenario a devastating neurological complication could occur while attempting to retrieve a catheter in an asymptomatic patient. Some patients may also not want to have surgery, for example a mother who has just given birth and does not want to interrupt her bonding with her baby.

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## The fragment should be removed surgically

Despite the lack of evidence of complications from a retained catheter fragment there have been reports of adverse consequences such as localized subcutaneous effusion (Demiraran et al, 2006) and neurological symptoms (Ugboma et al, 2002), both requiring neurosurgical removal of the retained catheter. Additionally some patients may not be comfortable living with a retained foreign body and there is evidence from long-term epidurals that granulomas can form (North et al, 1991). The possibility also remains that the retained fragment could migrate, causing symptoms at a later date. The implications for further central neuraxial blocks are relatively unknown.

## Imaging

Where there are clear neurological or infective signs urgent imaging is vital. Key to this decision is thorough clinical examination and early discussion with the neurosurgical team and radiologist. Whether to image the asymptomatic patient or not remains contentious since it may not affect overall management and exposes the patient to unnecessary radiation.

Furthermore imaging modalities may not pick up catheter fragments, making a negative scan difficult to interpret. Epidural catheters that the manufacturers state are radio-opaque often do not appear on lumbosacral X-rays evidenced by many of the case reports cited here. In a review of imaging in this scenario Mitra and Fleischmann (2007) state that computed tomography is the imaging modality of choice especially for ferromagnetic catheters, which are seen more clearly than with magnetic resonance imaging. Magnetic resonance imaging has limitations for ferromagnetic catheters because of artifact, a theoretical risk of neural damage as a result of heating and damage to surrounding tissue through movement of these catheters.

## Conclusions

Breakage of an epidural catheter within a patient is a rare but challenging event and management remains controversial. In most cases the patient will remain asymptomatic and a conservative approach is best adopted. This involves leaving the broken catheter fragment in situ, educating the patient about signs and symptoms which warrant immediate medical consultation, and providing long-term follow up. In all cases it is prudent to get the opinion of the local neurosurgical team and consider imaging. Finally, an open and honest discussion with the patient, involving him/her in decision making and clear documentation of the entire event are of utmost importance. **BJHM**

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