

Racz Catheter Percutaneous Epidural Neuroplasty (The Racz Procedure)

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66.1 Introductions

66.1.1 Epidural Neuroplasty

The Racz procedure typically involves accessing the epidural space by using a blunt-tip needle and inserting a catheter. The tip of the catheter is designed as round, deflective, atraumatic, and kink/collapse resistant. The catheter is then advanced to the adhesion site, where epidurography was used to map out the adhesions [1]. The analgesic effect is mediated by chemical adhesiolysis via the administration of local anesthetics, steroids, 10% hypertonic saline, and hyaluronidase, rather than by mechanical ablation [2]. Consent is required to use hyaluronidase, a noninsurance-applicable drug.

The Racz procedure, a minimally invasive and effective technique, represents an important part of the interventional repertoire for the treatment of axial spinal or radicular pain.

66.2 Indications

Failed back surgery syndrome, axial pain of the neck/back, and radiculopathy secondary to epidural fibrosis after surgery are good indications for the use of the Racz procedure.

Some cases of spinal stenosis or disk herniation are adapted for the Racz procedure, including cases of contrast injection (epidurography) that demonstrate filling defects corresponding to patients' radicular complaints.

66.3 Anatomy

See sections of epidural block, discography, selective nerve root injection, and epiduroscopy.

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Understanding the three-dimensional positional relationship between the epidural space, nerve root, facet joint, and foramen is important.

66.4 Instruments and Drug Solutions (Fig. 66.1)

RX epidural needle®, spring guide epidural catheter (Racz catheter, Epimed International), and C-arm fluoroscopy unit.

66.5 Procedures and Techniques [1]

A procedure is selected based on the caudal, transforaminal, or interlaminar placement of catheters. Epidural fibrosis should be diagnosed by performing epidurography and neurological examinations in advance. A catheter is inserted in

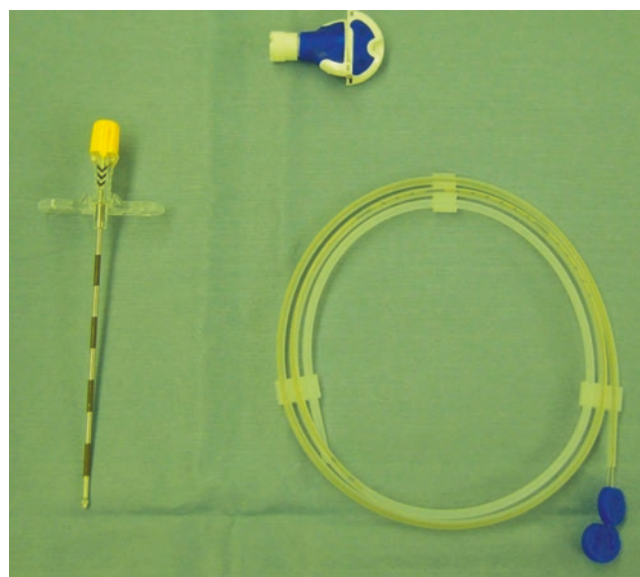


Fig. 66.1 Racz catheter kit (RX epidural needle®, spring guide epidural catheter, and Stingray® Connector)

the desired symptomatic site in the ventral lateral epidural space. Interlaminar catheters are placed in the case of cervical and thoracic adhesiolysis. The caudal and transforaminal placement of catheters will be described in detail, frequently performed in lumbar and caudal adhesiolysis.

66.5.1 Caudal (Trance Hiatus) Approach

The patient is positioned on the table in the prone position. The sacral hiatus is identified via palpation or with X-ray fluoroscopy-guided method. The needle entry point is 1–3 cm lateral and 3–5 cm caudal to the sacral hiatus on the

side opposite the documented radiculopathy (Figs. 66.2 and 66.3). The needle is inserted in the sacral canal through the sacral hiatus. The needle tip should cross the midline of the sacrum toward the side of the radiculopathy and should be below the level of the S3 foramen. After confirmation of the proper placement of the needle on anteroposterior (AP) and lateral fluoroscopic images, a Racz catheter with a bend in the distal tip is inserted through the needle. The bend should be 2.5 cm from the tip of the catheter, at a 30° angle. The bend will enable steering of the catheter to the target level. The direction of the catheter is just near the midline to advance the catheter to the dorsal epidural space. Then, the curve is directed to the ventral lateral target epidural site.

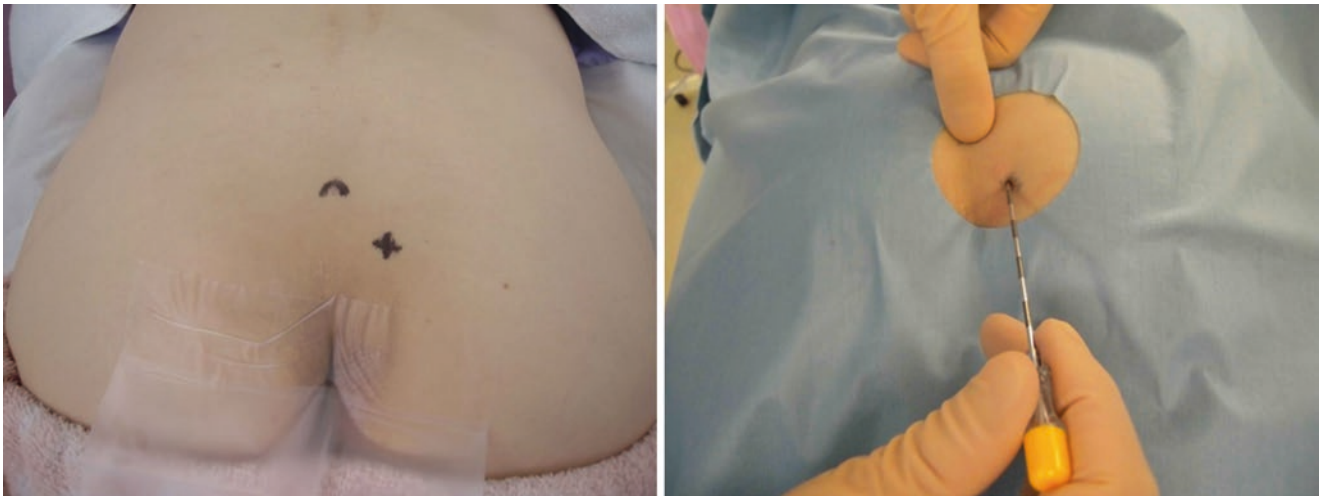


Fig. 66.2 Needle entry of caudal approach

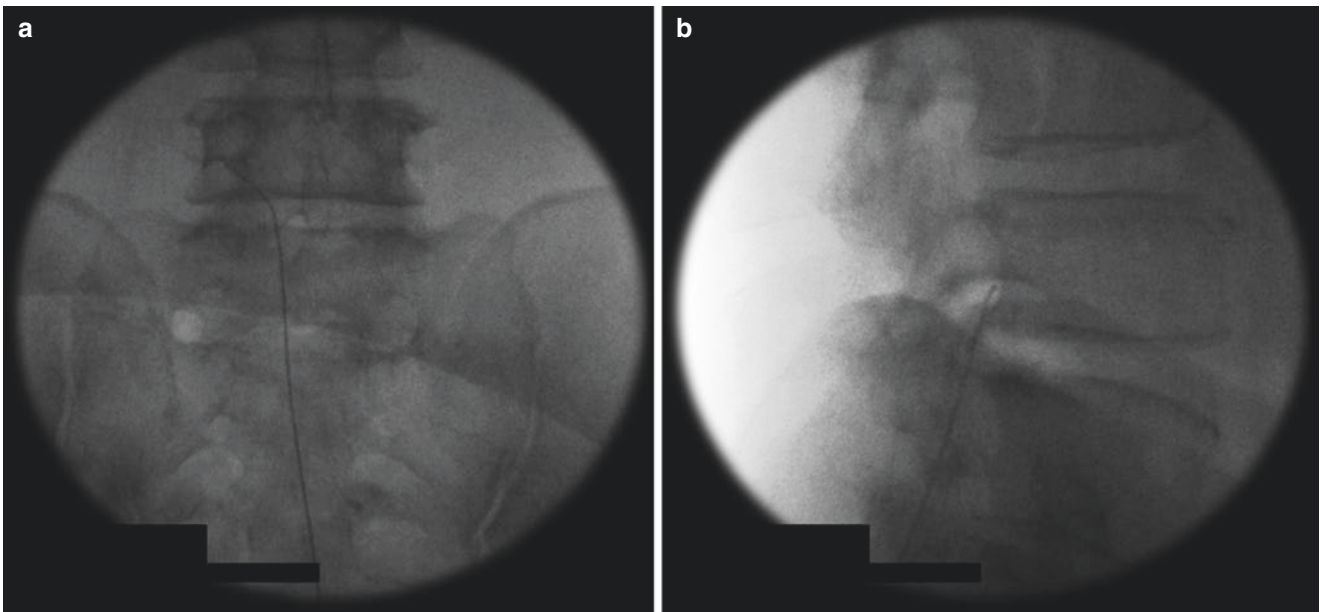


Fig. 66.3 (a) AP epidurogram of caudal approach. (b) Lateral epidurogram of caudal approach

Needle rotation and catheter navigation may need to be used to reach the target. Check the AP and lateral fluoroscopic images to confirm that the catheter tip is in the ventral lateral epidural space.

66.5.2 Lumbar Transforaminal Approach (Figs. 66.4 and 66.5)

The patient is positioned on the table in the prone position. The C-arm is tilted toward the side until the adjacent vertebral end plates are aligned and angled laterally in the oblique view and until the upper tip of the subject's superior articular process (SAP) is pointing medial to the mid-point above the vertebral body. The needle entry point is a fluoroscopic landmark of SAP, which is usually 6–10 cm laterally from a median line. The needle with a curved tip directed medially is inserted and advanced under fluoroscopy-guided method until contact is made at the upper portion of the SAP, closer to its lateral edge. The needle is turned until the curved tip is directed laterally and then advanced about 1–2 mm away from the SAP. Anterior to

the SAP, the needle is rotated until the curved tip is redirected medially. Then, the needle is advanced through the intertransverse ligament until a “pop” is felt. The “loss of resistance” technique is safer than feeling for a “pop” to confirm that the needle tip is placed in the neural foramen. Once the intertransverse ligament is perforated, the catheter is steered to the ventral lateral epidural space or, anatomically, in the foramen above or below the exiting nerve root [3]. Placement of the catheter in the anterior epidural space is then confirmed on a lateral image.

66.5.3 Standard Protocol of Adhesiolysis (1–2 Days of Hospitalization)

1. Iohexol 240 is injected through the catheter to outline the filling defect.
2. Dexamethasone 4–8 mg (+ hyaluronidase 1500 units diluted in 10 mL of preservative-free saline) is injected.
3. An injection of a local anesthetic (5–10 mL of 0.2–0.3% ropivacaine or levobupivacaine) is provided. The volumes of the injectates vary with the target site.

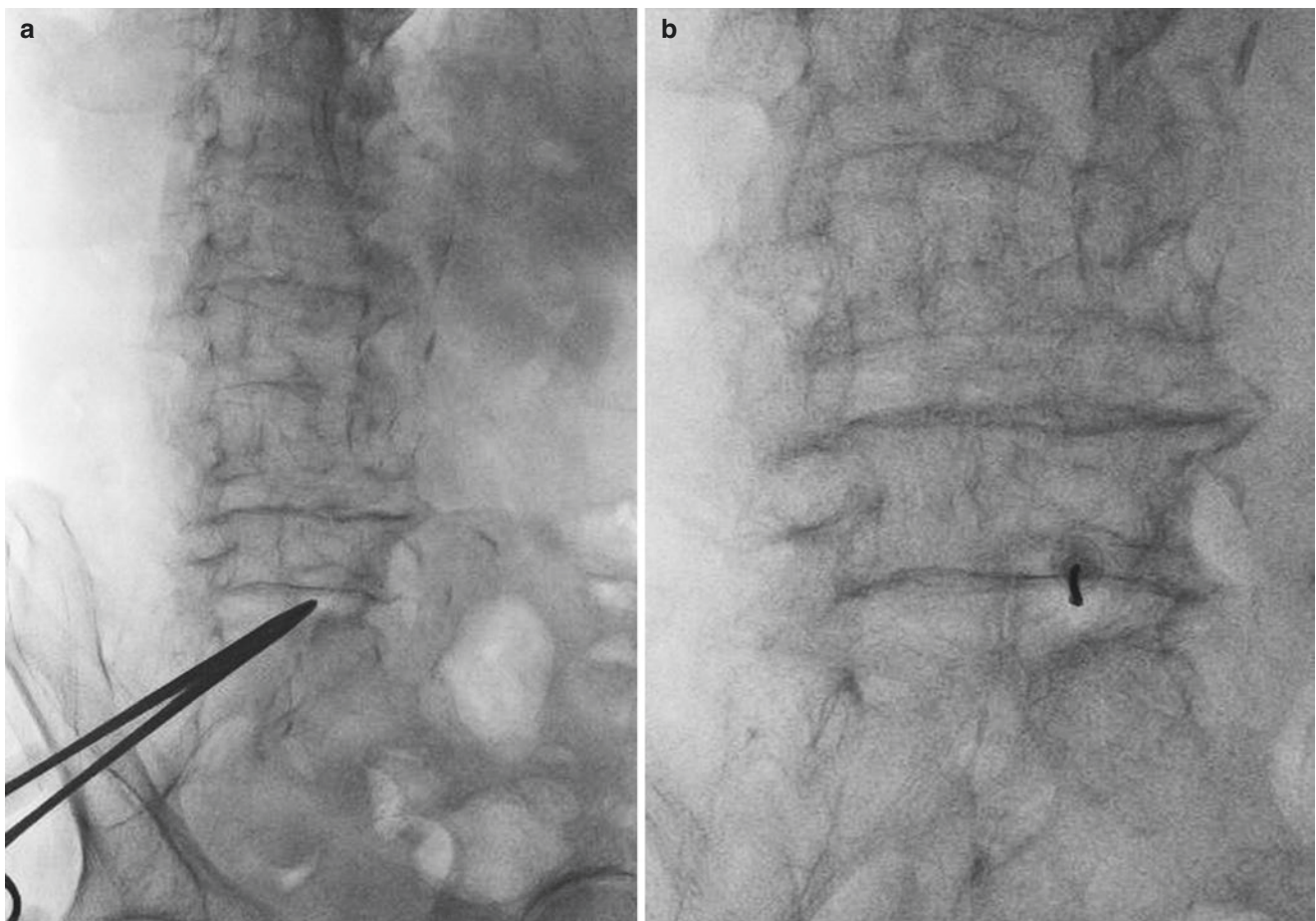


Fig. 66.4 (a) Oblique view of transforaminal approach. (b) Needle advancing into neural foramen

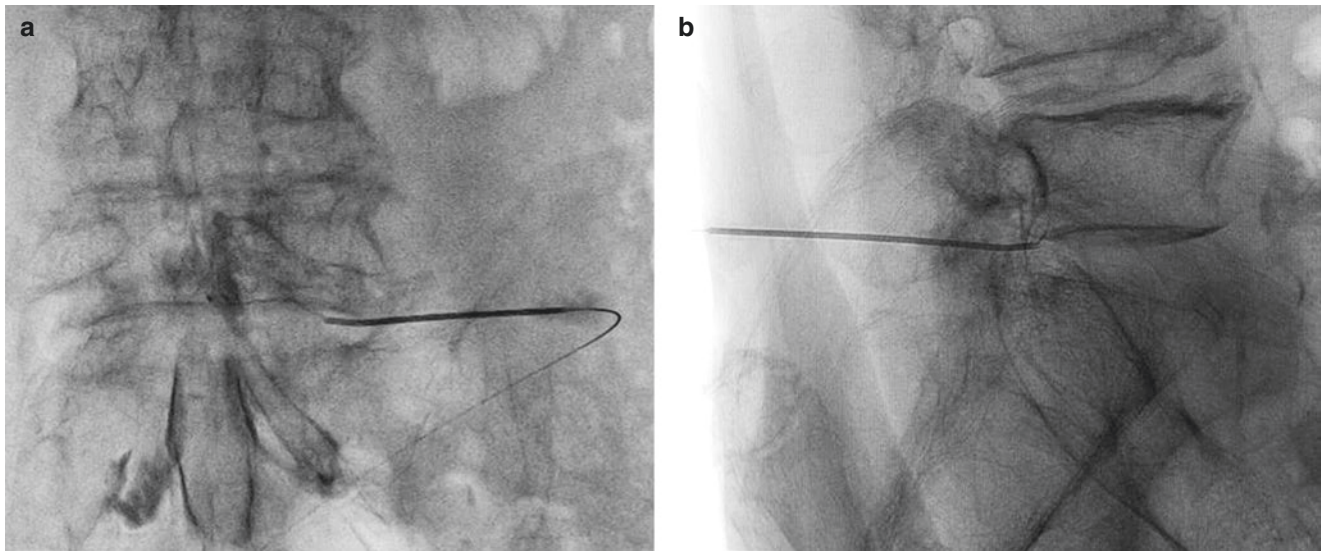


Fig. 66.5 (a) AP epidurogram of transforaminal approach. (b) Lateral epidurogram of transforaminal approach

4. The patient's motor function is evaluated 20–30 min after local anesthetic injection, and 8–10 mL of 10% hypertonic saline is injected over 30 min.
5. Steps 3 and 4 are repeated on the second day.
6. The catheter is removed at the time of discharge.

66.6 Complications

As for any epidural intervention, intravascular injection, transient nerve irritation, dura puncture, epidural abscess, and torn catheter during withdrawal are some of the general

complications associated with the Racz procedure. Strict evaluation of contrast radiographs is required to prevent subarachnoid injection of local anesthetic or hypertonic saline.

References

1. Racz GB, et al. Epidural lysis of adhesions and percutaneous neuroplasty. London: INTECH Open Access Publisher; 2012.
2. Lee F, et al. Epidural lysis of adhesions. Korean J Pain. 2014;27(1):3–15.
3. Zhu J, et al. Alternative approach for lumbar transforaminal epidural steroid injections. Pain Physician. 2011;14(4):331–41.