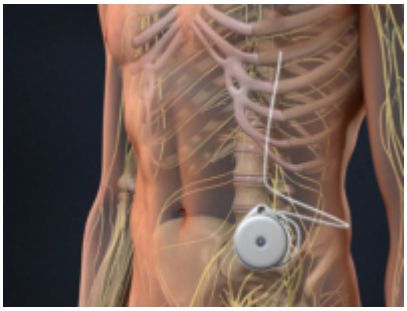
Implantable drug delivery pump



Although satisfactory pain control can be achieved with either epidural or intrathecal narcotics (morphine diffuses easily through the dura to the CSF where it gains access to pain receptors), epidural catheters commonly develop problems with scarring and may become less effective sooner than intrathecal catheters. Pumps should only be implanted if patients have successful pain control with test injection of spinal epidural (5–10 mg) or intrathecal (0.5–2 mg) morphine. A life expectancy of >3 months is recommended for implantable pumps (if shorter longevity is anticipated, an external pump may be used). One such series of commonly used implantable drug delivery pumps is manufactured by Infusaid Inc.. The only needle that should be used with their devices are special 22 gauge Huber (non-coring) needles. Delivery rates increase with body temperature 10–13%per °C above 37° C, they decrease by the same amount for every °C below 37° C, and also they become inaccurate at ≤ 4 ml of reservoir fluid. These pumps should never be allowed to run until empty, as this may permanently affect accuracy and reliability of drug delivery. In addition to the pump reservoir port, most models have one or more side “bolus” ports that delivers injected fluid directly to the outlet tubing. One should not aspirate when accessing either port. Medtronic produces a programmable pump.

Surgical insertion

Similar to the insertion of a lumboperitoneal shunt. The patient is placed in the lateral position, such as on a bean-bag device. The pump is inserted into a subcutaneous pocket, created with a slightly curved 8–10 cm skin incision. The pump may be sutured to the fascia of the abdomen (in obese patients, it may be sutured to the subcutaneous tissue). Excess tubing should be coiled underneath the pump to prevent inadvertent puncture when accessing either reservoir. The spinal catheter is inserted through a Tuohy needle inserted between lumbar spinous proc- esses either percutaneously or via a small incision 2–3 mm lateral to the spinous processes. Alternatively, it may be inserted directly via a hemilaminectomy. Fluoroscopy may be used intraoperatively to verify rostral placement of the catheter; radiographic visualization of the catheter may be aided by filling it with iodinated contrast, e.g. Omnipaque-300. All bends in the tubing should be very gradual to avoid kinking.

Post-op pain management

Although the pump will be infusing when the patient leaves the operating room, unless they have been on intraspinal narcotics up until the time of surgery, it will usually take several days for the drug to reach equilibrium in the CSF before the level of pain control will be adequate. This can be mitigated by a bolus infusion (3–4 mg morphine for epidural catheters, or 0.2–0.4 mg for intrathecal catheters).

Intrathecal Drug Delivery Device

see Intrathecal Drug Delivery Device