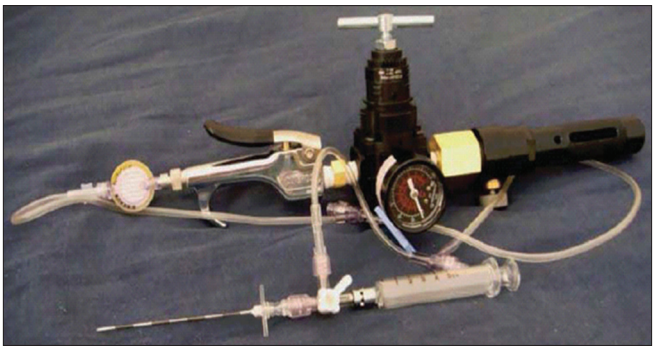

Figure 1: This device allows for a syringe to be filled, with CO_2, to assist in epidural space localization

Carbon dioxide (CO_2) would allow for the same ease of localization as air. This occurs as the bulk modulus of CO_2 is almost identical to that of the air.[3,4] It thus has a similar "feel" when used for identification of the epidural space. CO_2 is also readily absorbed across cell membranes and is more rapidly eliminated, from tissues, than air.[5,6,7] Furthermore, CO_2 is actively transported, utilizing carbonic anhydrase, from the cerebral spinal fluid.[8]

A preliminary device has been developed, which allows for CO_2 to be uncomplicatedly administered, through a three-way stopcock, into a traditional glass syringe. This device is illustrated in the [Figure 1].

Preliminary testing of this technique, on cadaveric bovine spinal sections, has demonstrated that CO_2 may be a reasonable alternative, to both air and saline, for epidural space localization. Further research is necessary to fully assess the potential benefits, and limitations, of this technique.

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Use of loss of resistance, to carbon dioxide, in identifying the epidural space

The use of air, in localizing the epidural space, has been associated with suboptimal or "patchy" anesthesia as well as the rare occurrence of venous and cerebral air emboli. Saline has been documented to be superior and devoid of these side effects.[1,2] However, saline, being virtually incompressible with respect to air, is significantly more difficult to use for localization of the epidural space.

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