

Ultrasound-assisted epidural anesthesia to amyotrophic woman

Hideki Taninishi · Keishi Kawano ·
Kiyoshi Morita

Received: 8 December 2012 / Accepted: 18 March 2013 / Published online: 2 April 2013
© Japanese Society of Anesthesiologists 2013

Keywords Epidural · Ultrasound assistance · Amyotrophy · Respiratory failure

To the Editor:

A 32-year-old woman (height 140 cm, weight 20.4 kg) was scheduled to undergo ileocecal colostomy for an intractable pelvic abscess caused by a perforated sigmoid diverticulum. She had congenital systemic amyotrophy of unknown cause. Her forced vital capacity was 0.65 l (percent of predicted vital capacity, 25.0 %), and intermittent noninvasive positive pressure ventilation (NIPPV) was performed because of severe hypercapnia (preoperative carbon dioxide tension, 70.1 mmHg). Her respiratory status could not guarantee safe perioperative management by general anesthesia. Because her backbone was not deformed radiologically (Fig. 1a, b), perioperative anesthetic management by epidural anesthesia was applied as a first choice.

First, we tried to insert an epidural catheter by the landmark method. However, no spinous process was palpable because she could not hunch her back. Therefore, detection of intervertebral spaces was attempted with the assistance of ultrasound (M-turbo; Sonosite, WA, USA), and only one intervertebral space, probably T12, was detected (Fig. 1c). The distance from skin to epidural space was approximately 2 cm. After making a mark with sterilized ink on the area of the probe center, epidural catheter

insertion was attempted. Loss of resistance was achieved at a depth of 2.5 cm from the skin, and the catheter was inserted in the head direction for 3 cm. Intraoperative anesthetic management was completed by 1 % (6 ml) and 0.75 % (2 ml) epidural lidocaine with intravenous infusion of dexmedetomidine for traction pain of peritonea. Oxygen saturation was kept above 97 % by use of NIPPV (room air). Continuous epidural infusion of 0.1 % ropivacaine (2–4 ml/h) for 6 days provided sufficient postoperative analgesia.

Use of muscle relaxant and subsequent mechanical ventilation during general anesthesia or postoperative pain temporarily impairs pulmonary function. Because her forced vital capacity after a minor lower abdominal procedure decreased more than 20 % [1], postoperative forced vital capacity in our patient was predicted to be around 500 ml. Further respiratory impairment would reduce quality of life because of dependence on mechanical ventilation and loss of verbal communication by tracheostomy. Effect of epidural anesthesia on respiratory function is minor even if the sensory block has reached the T4 level [2]. We therefore selected epidural anesthesia.

Although our patient's height was that of a lady of small structure for a Japanese, her body weight was that of a child around 6 years of age. Our patient's height-to-weight ratio, which was different from that of a normal child, and her extended back made it difficult to determine intervertebral spaces by the landmark method. Use of ultrasound makes it possible to noninvasively determine the point of needle insertion and the pathway and distance from the skin to epidural space [3]. Regrettably, "ultrasound-guided" epidural anesthesia was not performed in our patient because the intervertebral space disappeared from the ultrasound screen with minimal movement of the ultrasound probe. However, our experience suggested that only

H. Taninishi (✉) · K. Kawano · K. Morita
Department of Anesthesiology and Resuscitology, Okayama
University Graduate School of Medicine, Dentistry and
Pharmaceutical Sciences, 2-5-1, Shikata-cho, Kita-ku,
Okayama 700-8558, Japan
e-mail: tanishi@ops.dti.ne.jp

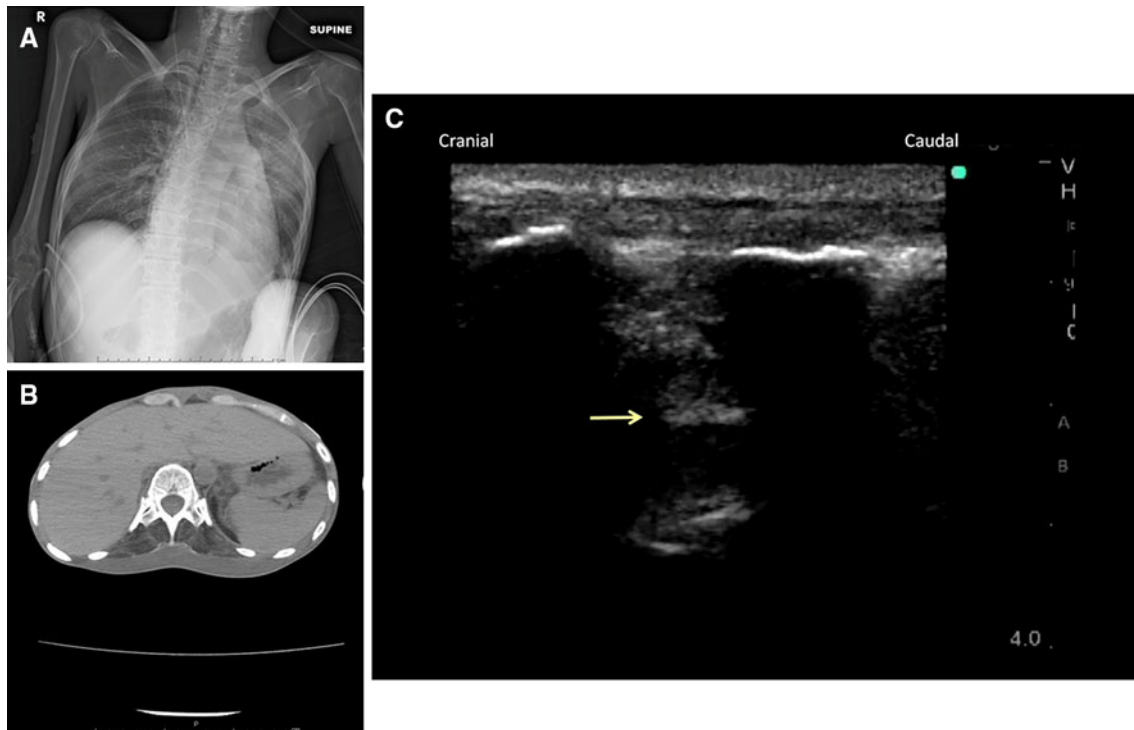


Fig. 1 **a** Image of plain chest–abdominal radiography. The patient’s bone structure was small and her backbone was slightly curved, but every intervertebral space was detected. **b** Image of computed tomography at T12 level. No spinal twisting was detected. We made the decision from these radiologic findings that we could perform

pre-scanning by ultrasound for determination of the epidural space in a patient with poor vertebral development is useful for preventing irreversible deterioration of preexisting respiratory failure.

References

1. Ellstrom M, Olsen MF, Olsson JH, Nordberg G, Bengtsson A, Hahlin M. Pain and pulmonary function following laparoscopic

epidural anesthesia. **c** Sagittal median view of spine by ultrasound. Ultrasound image between spinous processes was detected for only one intervertebral space (probably T12–L1), and the distance from skin to epidural space (arrow) was about 2 cm

- and abdominal hysterectomy: a randomized study. *Acta Obstet Gynecol Scand.* 1998;77:923–8.
2. Freund FG, Bonica JJ, Ward RJ, Akamatsu TJ, Kennedy WF. Ventilatory reserve and level of motor block during high spinal and epidural anesthesia. *Anesthesiology.* 1967;28:834–7.
3. Grau T, Leipold R, Conradi R, Martin E. Ultrasound control for presumed difficult epidural puncture. *Acta Anaesthesiol Scand.* 2001;45:766–71.