

Real-time Ultrasound Guided Epidural Catheter Placement in Morbidly Obese Parturients after Unsuccessful Conventional Attempts

Alexandre Gnaho*, Clément Hoffmann, Sylvain Vico and Marc Emmanuel Gentili

Department of Anesthesia and Intensive care, Hôpital d'Instruction des Armées Begin, 69, Avenue de Paris, 94160 Saint Mandé, France

Abstract

Several studies have emphasized the usefulness of preprocedural Ultrasound (US) assessment of lumbar spine. Despite those helpful informations this procedure may remain challenging. This report evaluates the effectiveness of a Real Time US Guided Epidural Anesthesia (RTUGEA) in morbidly obese patients as usual loss of resistance technique combined with a preinsertion US assessment of lumbar spine had failed.

We performed successfully RTUGEA, in ten morbidly obese parturients. The epidural space was identified in all patients and one to three attempts was necessary to reach the epidural space. The tip of Tuohy needle was not visible in 4 cases. We were able to identify the catheter in one out of ten cases. None inadvertent dural puncture was recorded. Recovery from epidural analgesia was uneventful in all cases.

To our knowledge, there is no published data on real time ultrasound guided epidural anesthesia in morbidly obese patients. Our data support the usefulness in morbidly obese patients of a RTUGEA for lumbar access. Further extended and randomized study is needed to assess safety and efficacy of such procedure.

Keywords: Ultrasound guided epidurals; Morbidly obese epidurals; Morbidly obese neuroaxial anesthesia

Epidural anesthesia in obese patients may be challenging. Several studies have emphasized the usefulness of preprocedural ultrasound (US) assessment of lumbar spine (predicting epidural space depth and optimum puncture point [1]). Despite those helpful informations this procedure may remain difficult for several reasons (permanent bony contact and/or difficulty to angle needle). In a previous study, a single operator performed an US guided epidural anesthesia in patients with normal anatomy [2]. Though, we believe that performing epidurals in obese patients needs probably additional help. This report evaluates the effectiveness of a real time US guided epidural anesthesia in morbidly obese patients as usual loss of resistance technique combined with a preinsertion US assessment of lumbar spine had failed.

We report this case series, after parturients and institutional

ethic approval. Parturients have given informed consent to publish this data. From May 31st 2010 to August 1st 2013 any parturient with morbid obesity (BMI>40 kg/m²) and in whom despite a preprocedural US assessment of lumbar spine, placement of the epidural catheter had failed, was invited to participate to this study. A 2-5 MHz curved array probe (Sonosite Edge™ Bothell, WA, USA) was applied over the sacrum for paramedian oblique sagittal plane scanning as described by Tran et al. the probe was then moved cephalad and intervertebral spaces were counted upward till the optimum intervertebral level [3,4]. At this time Real Time US Guided Epidural Anesthesia (RTUGEA) procedure was performed with the parturient in sitting position; a 17 G Tuohy needle (Vygon, France) was carefully advanced to the interlaminar space, under real-time US guidance, until the tip was inserted in the posterior part of the ligamentum flavum-dura mater complex. When the tip of the needle was not visible, movements of the tissues permitted the localization of Tuohy needle, then an assistant locked the probe and the operator confirmed the epidural space position of Tuohy needle with the standard loss of resistance technique in all cases. Attempts to reach the epidural space and its regional modifications during administration of saline were recorded. Extent of sensory block was assessed by cold and the degree of motor block according to Bromage score. Analgesic efficacy was defined using Visual Analog Sore (VAS). Patients satisfaction was assessed by a six point score (1: Very Good, 2: Good, 3: Average, 4: Sufficient, 5: Unsatisfactory and 6: Insufficient).

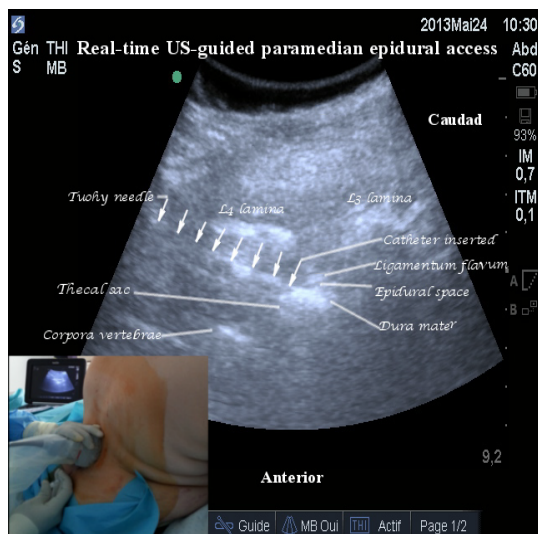


Figure 1: Paramedian oblique sagittal view: Tuohy needle and inserted catheter are visible on this sonogram.

*Corresponding author: Alexandre Gnaho, Department of Anesthesia and Intensive care, Hôpital d'Instruction des Armées Begin, 69, Avenue de Paris, 94160 Saint Mandé, France, Tel: +33(0) 6 6115 6998; Fax: +33(0) 1 4398 5401; E-mail: agnaho@hotmail.fr

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Patient no	Age (yr)	Height (cm)	Weight (kg)	BMI	ASA	Modification of ES at LOR
1	32	165	109	40.4	II	Anterior displacement of posterior dura and widening of ES
2	27	156	99	41.2	II	None
3	30	160	105	41.0	II	Anterior displacement of posterior dura and widening of ES
4	28	165	112	41.5	II	None
5	39	167	115	41.1	II	Anterior displacement of posterior dura and widening of ES
6	30	159	107	42.8	II	None
7	33	159	105	42.0	II	Anterior displacement of posterior dura and widening of ES
8	31	160	104	40.6	II	Anterior displacement of posterior dura and widening of ES
9	30	170	120	40.5	II	Anterior displacement of posterior dura and widening of ES
10	29	168	117	41.8	II	None

Table 1: Patient's characteristics.

Data were analyzed using Microsoft xlstat software and presented as mean (range).

We performed successfully RTUGEA, in ten morbidly obese parturients (Figure1).

The ten patients ASA II; mean age 30.9 (27-39) yr; weight 114.1 (99-117) kg; Height 162.9 (156-170) cm and BMI 41.3 (40.4-42.8) kg m⁻² (Table1).

The epidural space was identified in all patients and one to three attempts was necessary to reach the epidural space. The tip of Tuohy needle was not visible in 4 cases. We were able to identify the catheter in one out of ten cases. All the patients had sensory blockade between T12 and T8, motor blockade was at 2 for 8 out of 10 patients and 3 for 2 out of 10, 30 min after the catheter placement. 8 out of 10 patients had satisfaction score at 2 and the others at 5 and 6 respectively. None inadvertent dural puncture was recorded. Recovery from epidural analgesia was uneventful in all cases.

Discussion

This is the first report of real time US guided epidural catheter placement in morbidly obese patients. Obesity can lead to a higher incidence of technical difficulties: more puncture attempts, higher failure rate, and increased accidental dural puncture [3]. We have been able to place successfully the epidural catheter in all our morbidly obese parturients in a maximum of three attempts.

In previous studies concerning the use of US for obese patients, Grau and al have underlined the usefulness of prepuncture informations given by US for presumed difficult epidurals using a paramedian approach, in a population of patient including 30% of obese parturients; however none of them were morbidly obese [4].

Balki et al. suggested that US may facilitated epidural catheter placement, performing a preinsertion US examination using an exclusive transverse plane, in a population of obese parturient [5]. We believe that preinsertion US examination should combine both longitudinal and transverse approaches for determination of optimum puncture point. However prepuncture US assessment of lumbar spine does not solve all the problems in difficult situations.

Karmakar et al. have demonstrated a successful use RTUGEA in paramedian epidural access, performed by a single experienced physician. We also used a longitudinal paramedian with oblique angulation of the probe, as neuroaxial structures are better seen through paramedian longitudinal plane than through the transverse plane [2]. However; we believe that such difficult lumbar accesses require more hands. Our procedure needed two persons including an experienced operator.

Main limitation of this study is that it did not compare the real time guidance, preprocedural procedure and exclusive loss of resistance technique.

Conclusion

Our report suggests that RTUGEA could be a solution for difficult lumbar accesses in morbidly obese patients when US pre-insertion assessment was unsuccessful. Further extended and randomized study is needed to assess safety and efficacy of such procedure which requires an advanced interventional skill.

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