A Comparison Between the Glass Syringe and the Episure™ AutoDetect™ Syringe for Identifying the Epidural Space Using the Loss of Resistance Technique

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Introduction

The loss of resistance (LOR) technique is commonly used to identify the epidural space (ES). The Episure™ AutoDetect™ syringe (EAS) is a new LOR syringe with an internal compression spring that applies constant pressure on the plunger. This obviates the need to apply pressure on the plunger and allows the operator to use both hands while continuously advancing the epidural needle. The plunger of the syringe automatically depresses when the needle enters the ES. This study compares the performance of the EAS with that of the glass syringe when used to identify the ES in laboring women in a teaching institution.

Methods

After IRB approval, and informed patient consent, laboring women requesting epidural analgesia were enrolled. All epidurals were inserted in the sitting or lateral position using an 18 G Tuohy needle. The blocks were performed by 8 residents and 2 attendings. The residents alternated the use of the glass syringe (B. Braun Medical Inc. Bethlehem, PA) and the EAS during their 4 weeks rotation. Each syringe was used for a week before switching to the other syringe. Data recorded included patient demographics, depth to the ES, number of attempts, time to locate the ES, the occurrence of false LOR, inadvertent dural puncture, intravascular placement, and failed blocks. At the end of participation in the study, the residents and attendings were asked to complete a survey to evaluate their experience with EAS. They were also asked to indicate whether they would consider using the new syringe over what they were currently using. Statistical analysis was performed using the t-test, Wilcoxon signed rank test, and Fisher's exact test. P<0.05 was considered statistically significant.

Results

325 women were enrolled in this study. The residents performed 291 blocks and the attendings 34. Four residents were second year residents on their second obstetric rotation, while the other four were first year on their first rotation. The results are summarized in Table 1. There were no differences in patient demographics, cervical dilatation, or depth to the epidural space between the two groups. There were 5 failed blocks requiring catheter replacement in the glass syringe group and none in the EAS group (p=0.03). Similarly, there were 4 inadvertent dural punctures in the glass syringe group and none in the EAS group (p=0.05). When the ES was identified in one attempt, the time needed to identify the ES was quicker with EAS (p=0.02). On 4 occasions, the residents switched from the EAS to the glass syringe due to loss of saline from the EAS on 3 occasions, and the need for frequent redirection during placement of a difficult epidural on one occasion. The results of the survey performed at the end of the study period are summarized in Table 2. Eight of the 10 participants indicated that they would consider using the EAS for epidural placements over what they were currently using.

Conclusion

Using the EAS allowed reliable and quick identification of the epidural space in laboring women. There were no inadvertent dural punctures or failed blocks with the EAS in this pilot study. Further larger studies are required to confirm whether the use of this syringe will confer advantages compared with the currently used LOR syringes.

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Table 1. Patient Demographics and Results

	Glass (n=157)	EAS (n=168)
Age	28±7	27±6
Height, cm	163±8	162±8
Weight, kg	85±20	81±15
Gestational age, weeks	38±4	38±4
Cervical dilatation, cm	4.5±2	4±2
Depth to the epidural space, cm	6±1	6±1
Number of attempts	1 (1-6)	1 (1-3)*
Intravascular catheter	7 (4.5)	9 (5.4)
Inadvertent dural puncture	4 (2.6)	0 (0)*
Failed block	5 (3)	0(0)*
Time to identify epidural space, sec	42±23	27±35*

Data are mean ± SD, median (range), or number (%), * p≤0.05

Table 2. Results of Post Study Survey

Ability of EAS to accurately identify the ES (1=not at all accurate, 5=very accurate)	5 (4-5)
Having 2 hands on the needle provided improved stability and control (1=no improvement, 5=significant improvement)	4 (3-5)
Easy to use (1=very difficult, 5=very easy)	4 (3-5)
Useful learning tool (1=not at all useful, 5=very useful)	4.5 (4-5)
Useful teaching tool (1=not at all useful, 5=very useful)	4.5 (4-5)

Data are median (range), EAS=Episure™ AutoDetect™ syringe, ES=epidural space

This study was supported in part by an unrestricted educational grant from Indigo Orb.