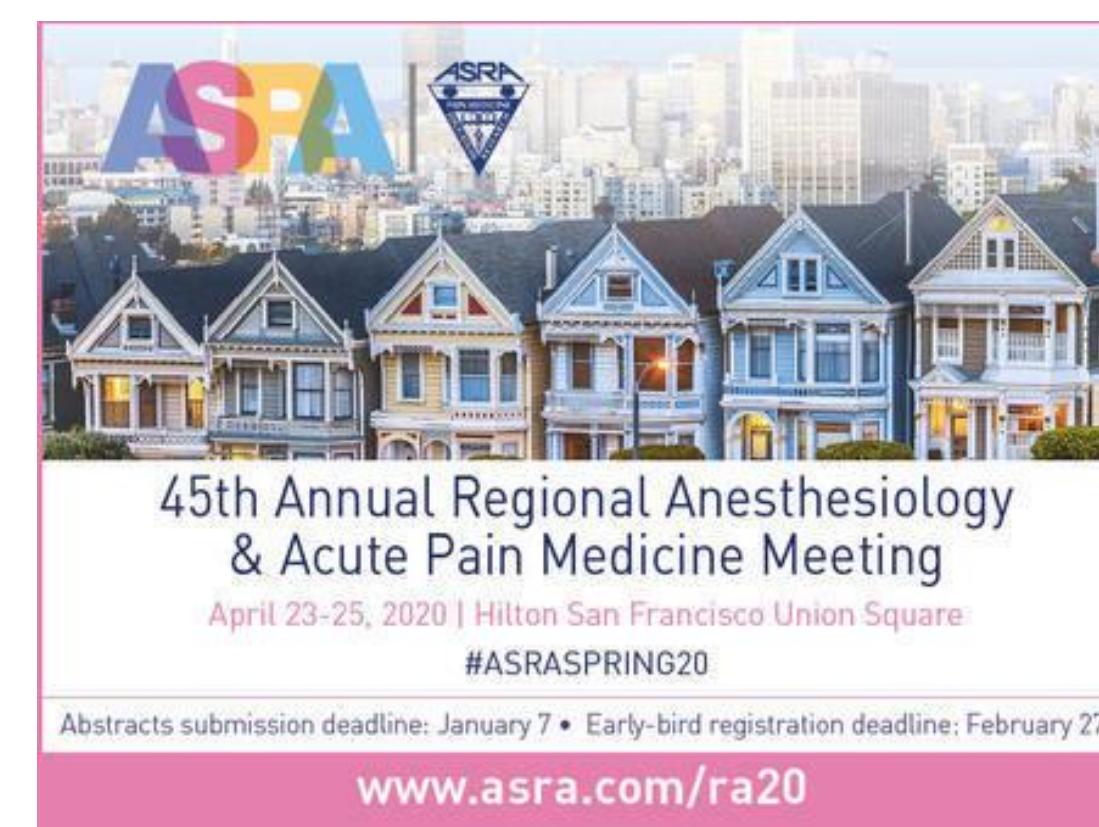


Cost Effectiveness Analysis of Two Labor Epidural Analgesia Techniques; Real-Time Pressure Sensing Technology and Traditional Technique

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Introduction

Accidental dural puncture (ADP) is a complication of epidural anesthesia with reported rates of 0.5-4% (1). Following ADP, the incidence of post-dural puncture headache (PDPH) has been reported to be more than 75%. It is a significant cause of increased cost, prolonged hospitalization and need for further treatment and interventions such as epidural blood patch (2). The use of continuous real-time pressure sensing technology (Compuflo) has been recently validated as a tool to identify the epidural space and is gaining popularity as an alternative to traditional loss of resistance (LOR) technique (3).

The aim of this study was to conduct a cost-effectiveness analysis of real-time pressure sensing technology and traditional LOR technique in parturients requesting labor epidural analgesia.



Methods

With approval of the Institutional Review Board, we collected data from electronic health records at UTMB to identify parturients aged between 18 and 50 who had epidural anesthesia for planned vaginal delivery between 2015 and 2019.

For the cost-effectiveness analysis, we estimated the total cost for the hospital stay for delivery and readmission for epidural blood patch (EBP) if any. We first categorized patients into two groups by the presence of epidural replacement. Within each group, we further categorized the patients into three groups: 1) no headache or EBP; 2) with headache but no EBP; 3) with EBP. Patients who had multiple orders for epidural anesthesia during the hospitalization were considered to have epidural replacement. Headache after epidural anesthesia was identified using international classification of diseases codes. All costs were adjusted to the same time period, using the consumer price index for medical care.

Results

We included 4483 deliveries from 4353 parturients in this study. We examined the parturient characteristics at the inpatient visit for delivery are presented in **Table 1**. The cost-effectiveness was performed using TreeAge. The model is presented in **Figure 1**. Incremental cost of both techniques are presented in **Table 3**.

Table 1. Parturient characteristics at the inpatient visit for delivery

Parturient characteristic	Mean \pm SD	Median
Age (years)	27.4 \pm 5.7	26.7
BMI (kg/m^2) [#]	32.3 \pm 6.5	31.3
Gravidity	2.7 \pm 1.7	2.0
Parity	1.7 \pm 1.3	1.0
	N	%
Race/ethnicity		
Asian	168	3.75
African American	506	11.29
Caucasian/White	1197	26.70
Hispanic or Latino	2591	57.80
Other	21	0.47

[#]319 records did not have info on BMI.

SD: standard deviation, BMI: body mass index

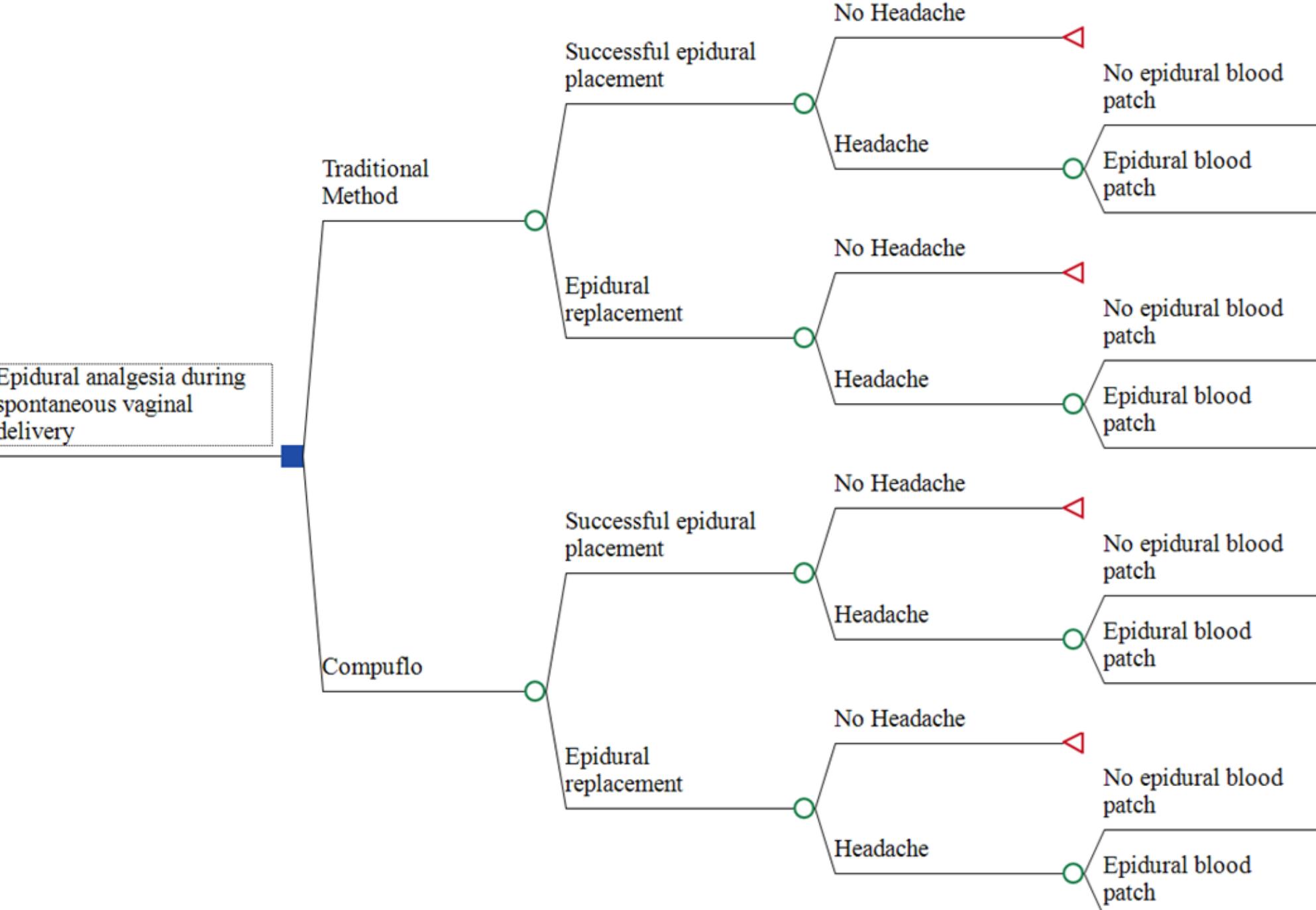


Figure 1. The cost-effectiveness skeleton decision tree model

Table 2. Incremental cost of traditional method compared to real-time pressure sensing technology method

Method	Cost	Incremental Cost	Effect (pain score)	Dominance
Study device	16363.02	0.00	2.00	
Traditional	16866.96	503.94	2.00	Dominated

Study device: (continuous real-time pressure sensing technology)

Conclusion

To our knowledge, this is the first study in the literature, we report cost of the real-time pressure sensing technique and the traditional LOR technique in parturients requesting labor epidural analgesia. Compared to the traditional LOR technique, real-time pressure sensing technology costs about 504 dollar less per hospital stay on average.

1. Russell S. Management strategies for unintentional dural puncture: a Canadian experience survey in an academic setting. Can J Anaesth. 2018
2. Amorim JA. Post-dural (post-lumbar) puncture headache: risk factors and clinical features. Cephalgia. 2012
3. Gebhard RE. Objective epidural space identification using continuous real-time pressure sensing technology: a randomized controlled comparison with fluoroscopy and traditional loss of resistance. Anesthesia & Analgesia. 2018