

Introduction

- └ Epidural anesthesia is commonly used to manage pain during childbirth globally.
- └ The traditional loss of resistance (LOR) approach has a failure rate of 1.5% to 23%. [1]
- └ For patients with BMI greater than 30 kg/m², the failure rate of epidural placement is 1.82 times greater. [2]
- └ The CompuFlo device offers feedback during epidural placement through its continuous fluid path that displays exit pressure at the Tuohy needle's tip which may help inexperienced trainees.
- └ It is also estimated that proficiency in Epidurals is achieved after 50+ attempts. [3]
- └ **The study aims to determine if using the CompuFlo device reduces the incidence of complications during epidural placement.**

Methods

- └ This retrospective study involved data from **67** patients who received epidural anesthesia with the help of the CompuFlo device at one hospital.
- └ The IRB has approved the analysis of patient data. The aim of this abstract was to examine the complications that arose with/after epidural placement during labor.
- └ These complications included:
 - Need for general anesthesia during C-section
 - Replacement of the epidural
 - Dural punctures
 - Postpartum issues such as headache, weakness, or back pain.

CompuFlo Device Assisted Epidural Complications

Sai Kamma BS¹, Henry Tran BS¹, Hiram Acevedo MD², Trent Weatherley BS¹, Allison Mullins MD², Rovnat Babazade MD²
¹University of Texas Medical Branch, School of Medicine, Galveston TX | ²University of Texas Medical Branch, Department of Anesthesiology, Galveston TX

Results

Table 1. Complications Stratified by Race

Race (n)	Mean Time (mins)	Mean BMI	Dural Puncture/ Postpartum Complications	Average ASA rating	Sum of Repeated Boluses	Replacement Rate
African American (5)	13.2	36.7	0	2.4	1	0
Asian (1)	8	25.4	0	2	1	1
Caucasian (47)	13.8	34.9	0	2.2	12	2
Hispanic (14)	14	31.9	0	2	2	1
Overall (67)	13.7	34.3	0	2.2	16	4

↳ The overall **failure rate** of epidurals requiring replacement in the patient population was **6% (4/67)**.

↳ C-section was performed on 15 patients with 3 requiring general anesthesia (20%).

↳ The failure rate was 4.2% in Caucasians.

↳ The failure rate 7.1% in Hispanics.

↳ The average BMI of the 4 patients with epidural failure was 30.4, which is lower than the overall study average BMI of 34.3.

↳ Of the 67 patients, **no dural punctures were recorded**, and only one patient experienced postpartum back pain.

↳ PGY-4 had a higher epidural failure rate at 13.6%, while PGY-3 had a lower rate at 5.9%.

↳ PGY-2 had a 0% failure rate but took the longest time, averaging 18.4 minutes.

↳ The average time to perform an epidural decreased with increasing experience level.

↳ Faculty members worked 35.3% faster than residents.

Table 2. Complications Stratified by Level of Training

Training Level (n)	Mean Time (mins)	Mean BMI	Dural Puncture/ Postpartum Complications	Average ASA rating	Sum of Repeated Boluses	Replacement Rate
PGY-2 (11)	18.4	37.1	0	2.4	3	0
PGY-3 (17)	15	33.1	0	2.1	2	1
PGY-4 (22)	11.6	32.1	0	2.1	11	3
Fellow (8)	12.1	31.9	0	2.1	0	0
Faculty (9)	11.9	40.4	0	2.2	0	0
Overall (67)	13.7	34.3	0	2.2	16	4

Discussion

- Our study is consistent with a 2005 study that found no significant difference in failure rate between black and white patients, concluding that race is not a predictor of epidural placement failure [4].
- Our results are also consistent with a 2006 study that found no significant difference in epidural placement failure based on resident training level [5].
- However, we found that training level did correlate to much faster epidural placement.
- Real-time pressure sensing technology saves about 504 US dollars in parturients requesting labor epidural analgesia per hospital stay on average [6].
- When epidurals are performed by trainees, there is a learning opportunity to achieve proficiency and quality technique with CompuFlo data feedback.
- Although epidurals are more difficult in severely obese patients, the epidural failure rate for our patients with a BMI > 35 kg/m2 was 0%.

Table 3. Patient Characteristics

Population (n)		67
Maternal Age (years)	Mean	24.8
	Standard Deviation	5.5
Maternal BMI (kg/m^2)	Mean	34.3
	Standard Deviation	8.4
Race	African American	5
	Asian	1
	Caucasian	47
	Hispanic	14
Parity	Nullipara	24
	Multipara	43
Epidural Performer	Faculty	9
	Fellow	8
	PGY-4	22
	PGY-3	17
	PGY-2	11
Delivery Mode	Vaginal	52
	Cesarean	15
Complications	Postpartum Complications	1.5% (1/67)
	Dural Puncture	0% (0/67)
	Epidural Replacement	6.0% (4/67)
	GA for Cesarean	20% (3/15)

References:

[1] Babazade R., Lin, Y.-li, Valles, G. H., Capogna, G., Micaglio, M., Vadhera, R. B., & Gebhard, R. E. (2020). Accidental dural puncture rate using real-time pressure sensing technology: A prospective Multicenter Observational Study. *Journal of Clinical Anesthesia*, 63, 109778.

[2] Uyl, N., de Jonge, E., Uyl-de Groot, C., van der Marel, C., & Duvekot, J. (2019). Difficult epidural placement in obese and non-obese pregnant women: A systematic review and meta-analysis. *International Journal of Obstetric Anesthesia*, 40, 52–61.

[3]. Drake EJ, Coghill J, Sneyd JR. Defining competence in obstetric epidural anaesthesia for inexperienced trainees. *Br J Anaesth*. 2015 Jun;114(6):951-7. doi: 10.1093/bja/aeu064. Epub 2015 Mar 23. PMID: 25804214.

[4] Vale, N., Pereira, D., Chantler, C., & Matthews, J. (2005). Failure rates for epidural analgesia in black and white parturients. *Anesthesia & Analgesia*, 100(5), 1418-1422.

[5] Vale, N., Pereira, D., Chantler, C., & Matthews, J. (2006). The effect of training level on the success of epidural block. *Anesthesia & Analgesia*, 102(1), 257-259.

[6] Babazade R, Lin YL, Valles GH, Capogna G, Micaglio M, Vadhera RB, Gebhard RE. Cost-minimization analysis of the continuous real-time pressure sensing technology in parturients requesting labor epidural analgesia. *Braz J Anesthesiol*. 2022 Jul 4;S0104-0014(22)00076-8. doi: 10.1016/j.bjane.2022.06.004. PMID: 35798209.