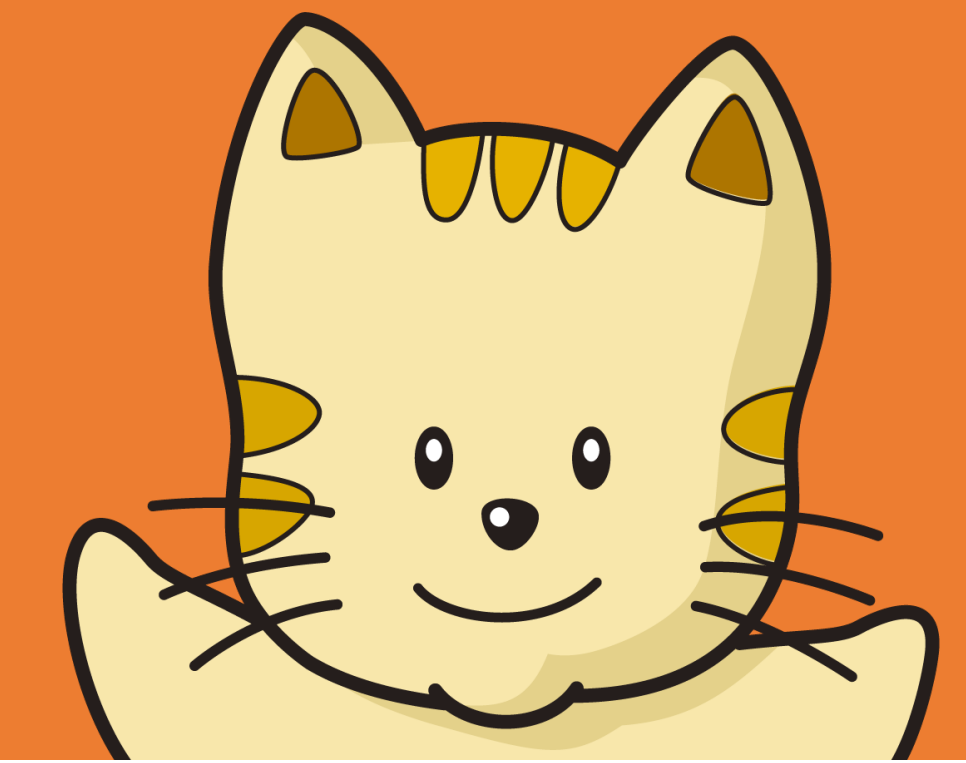


Assisted Reproductive Technology Is Not Associated With Satisfaction With Labor Epidural Analgesia

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Background

- **Assisted reproductive technology (ART)** have been increasing worldwide.¹ Numerous studies have shown that ART pregnancies involve more obstetric interventions.²⁻⁵
- **Satisfaction with labor epidural analgesia (LEA)** is influenced by instrument delivery, higher pain score, receiving LEA at a more advanced cervical dilation, epidural catheter replacement, and multiparity.⁶⁻⁸
- However, ART conception was not explicitly reported in these studies. It remains unclear whether ART conception independently affects LEA satisfaction.

Hypothesis

We hypothesized that maternal satisfaction with epidural labor analgesia differs between ART pregnancies and spontaneous pregnancies.

1. *Hum Reprod Open.* 2022;2022(3):hoac022.
2. *BMC Pregnancy Childbirth.* 2019;19(1):77.
3. *Dev Med Child Neurol.* 2023;65(1):38–49.
4. *Fertil Steril.* 2016;105(1):73–85.e1–6.
5. *J Dev Orig Health Dis.* 2017;8(4):388–402.
6. *J Anesth.* 2026;40(1):94–105.
7. *BMC Anesthesiol.* 2018;18(1):50.
8. *Int J Reprod Contracept Obstet Gynecol.* 2020;9(1):383–388.



Study Design & Methods

Retrospective study at Osaka Women's and Children's Hospital (2024)

Participants: Women who received epidural labor analgesia for singletons planning vaginal delivery

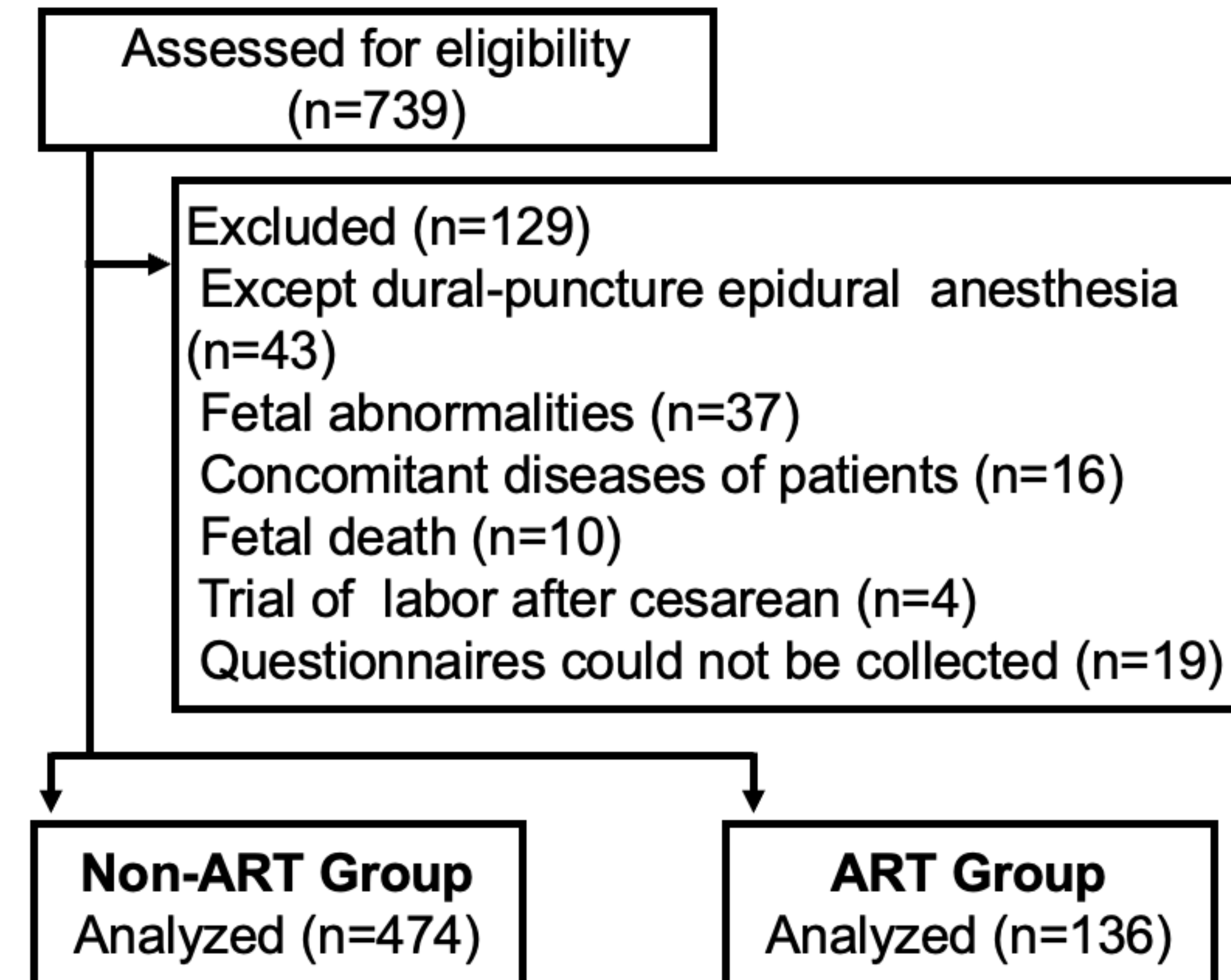
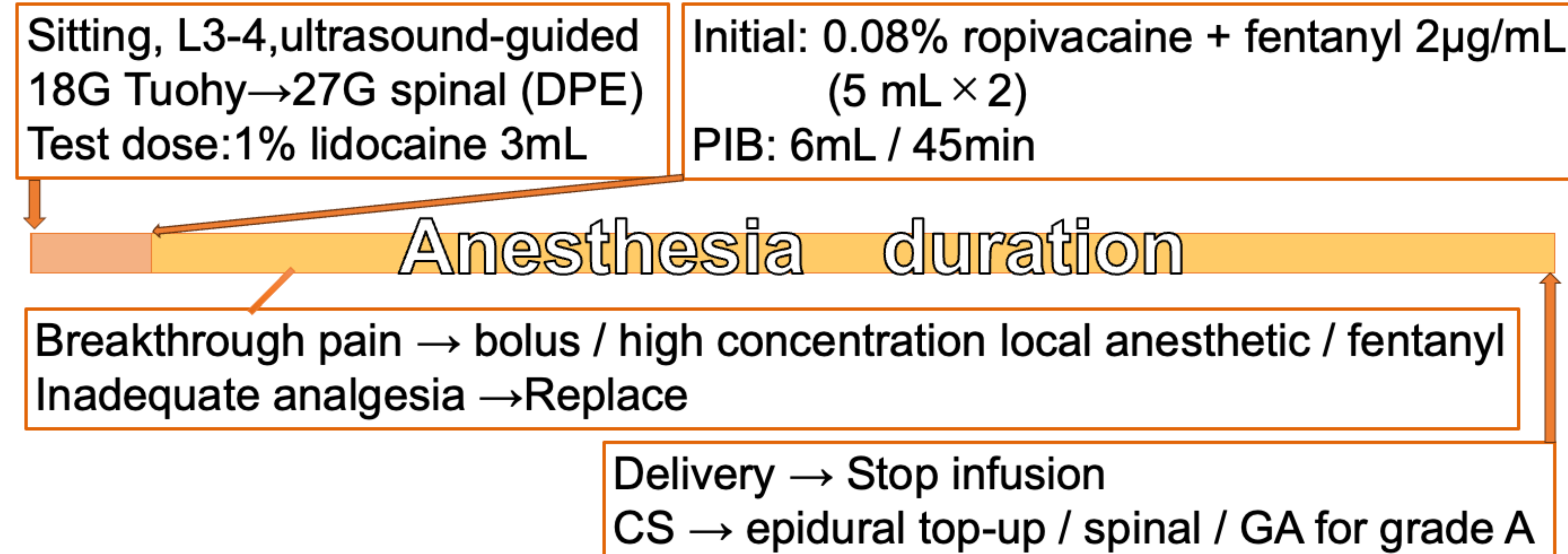
Exposure: Pregnancy conceived by ART vs spontaneous conception

Outcome: Maternal satisfaction with labor analgesia.

Data collected: Maternal characteristics, Obstetric factors, Labor characteristics, Epidural analgesia parameters

Analysis: Univariate analysis,
Multivariate regression analysis to identify factors associated with satisfaction

LEA protocol



Results

Table 1. Characteristic of women and childbirth in the study group

	non-ART (n=474)	ART (n=136)	P value
Age (years)	32.0 [30.0, 35.8]	35.5 [33.0, 39.0]	<0.001
BMI (kg/m²)	24.9 [23.1, 27.1]	25.0 [22.9, 27.0]	0.97
Educational level			0.85
Low education	74 (15.7)	20 (14.7)	
Medium education	120 (25.5)	32 (23.5)	
High education	277 (58.8)	84 (61.8)	
Nulliparity	193 (40.7)	41 (30.1)	0.028
Mental disorder	61 (12.9)	18 (13.2)	0.89
HDP	78 (16.5)	40 (29.4)	0.001
GDM	39 (8.2)	14 (10.3)	0.56
Use of Oxytocin	337 (71.1)	118 (86.8)	<0.001
Mode of delivery			0.003
NVD	332 (70.0)	74 (54.4)	
ID	113 (23.8)	51 (37.5)	
CS	29 (6.1)	11 (8.1)	
Perineal injury	405 (85.4)	121 (89.0)	0.33
Postpartum hemorrhage	163 (34.4)	82 (60.3)	<0.001
Partner presence	380 (80.2)	10 (80.1)	1
Cervical dilation (cm)	4.0 [3.0, 4.0]	4.0 [3.0, 4.0]	0.49
Fetal birthweight (g)	3125 [2843, 3372]	3190 [2919, 3502]	0.075
Apgar score at 5 min	9 [9, 9]	9 [9, 9]	0.48
Umbilical cord arterial blood pH	7.29 [7.25, 7.32]	7.29 [7.25, 7.32]	0.84
Anesthesia duration (hour)	6.4 [4.2, 9.6]	8.0 [4.9, 11.3]	0.004
Maximum NRS	5 [3, 7]	5 [4, 7]	0.034
Epidural catheter replacement	44 (9.3)	15 (11.0)	0.52
Complications during anesthesia			
Headache	34 (7.2)	9 (6.6)	1
Itch	244 (51.5)	59 (43.4)	0.099
Nausea	62 (13.1)	23 (16.9)	0.26
Numbness	134 (28.3)	39 (28.7)	0.91
Satisfaction	10 [9, 10]	10 [8, 10]	0.072

Table 2. Multivariable logistic regression analysis

Factor	β coefficient (95% CI)	P value
Age (years)	0.00 (-0.03 to 0.03)	0.91
Anesthesia duration (hours)	0.0 (0.0 to 0.0)	0.012
ART	-0.03 (-0.33 to 0.25)	0.79
Postpartum hemorrhage	-0.07 (-0.33 to 0.19)	0.60
BMI (kg/m²)	0.02 (-0.02 to 0.05)	0.37
Cervical dilation (cm)	0.01 (-0.09 to 0.11)	0.81
Delivery mode		
ID vs NVD	-0.24 (-0.53 to 0.04)	0.097
CS vs NVD	-0.47 (-1.14 to 0.19)	0.16
Educational attainment of the parturients		
Medium vs Low	0.05 (-0.32 to 0.43)	0.78
High vs Low	0.06 (-0.30 to 0.42)	0.74
GDM	-0.15 (-0.55 to 0.26)	0.47
HDP	-0.11 (-0.40 to 0.19)	0.47
Headache	0.16 (-0.29 to 0.60)	0.49
Partner presence	0.22 (-0.09 to 0.53)	0.16
Itch	0.03 (-0.20 to 0.26)	0.81
Maximum NRS	-0.14 (-0.19 to -0.09)	<0.001
Nausea	-0.02 (-0.32 to 0.35)	0.92
Numbness	0.08 (-0.17 to 0.33)	0.52
Oxytocin use	0.09 (-0.21 to 0.38)	0.57
Nulliparity	-0.16 (-0.45 to 0.14)	0.30
Perineal injury	0.06 (-0.37 to 0.50)	0.77
Mental disorder	0.10 (-0.24 to 0.44)	0.57
Epidural catheter replacement	-1.10 (-1.50 to -0.69)	<0.001

Satisfaction scores were **comparable between groups**. In multivariate analysis, **ART conception was not independently associated with satisfaction**.



Conclusion & Discussion

- Higher maximum intrapartum pain scores and epidural catheter replacement were independently associated with lower LEA satisfaction, consistent with previous studies.^{7,8}
- Epidural catheter replacement should not be interpreted as a negative intervention itself. Rather, it may serve as a marker of a suboptimal analgesic course characterized by technical difficulty, delayed recognition of failure, or repeated interruption of analgesia.⁹
- These findings support the importance of proactive assessment and timely intervention to minimize ineffective analgesia and ultimately improve maternal satisfaction.

ART itself was not independently associated with satisfaction with LEA.

These findings highlight the importance of optimizing analgesic efficacy and procedural quality to enhance maternal satisfaction during labor.

7. *BMC Anesthesiol.* 2018;18(1):50.

8. *Int J Reprod Contracept Obstet Gynecol.* 2020;9(1):383-388.

9. *Eur J Anaesthesiol.* 2025;42(2):96–112.

