Analyzing emergent cesarean delivery rates after external cephalic version following an obstetrical practice change, a retrospective cohort study.

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BACKGROUND

- Cesarean delivery (CD) is the most common method of delivery for a fetus in breech position as vaginal delivery is associated with increased neonatal morbidity and mortality.
- Breech presentation occurs in 3-4% of pregnancies.
- External cephalic version (ECV) is a non-invasive procedure to change the position of the fetus. It is an option for women desiring a vaginal delivery and involves rotating the fetus out of breech and into vertex position by applying manual pressure to the maternal abdomen. The goal of ECV is to facilitate a vaginal delivery.
- The use of neuraxial anesthesia during ECV has been found to increase the rate of successful ECV by as much as 60%.
- A previous study done at Mayo Clinic, Rochester, MN, revealed an increased rate of emergent cesarean deliveries in patients who received neuraxial anesthesia for ECV (3.7%). Completion of this study resulted in practice changes to decrease the rate of emergent CD after ECV. These changes included:
  - ❑ Moving the location of ECV from an operating room (OR) to a labor room
  - ❑ Decreasing the dose of local anesthetic given for an ECV
- Our study evaluated the effectiveness of this institutional practice change directed at reducing the rate of emergent CD at the time of ECV.

OBJECTIVES

- Evaluate the effectiveness of an institutional practice change at reducing the rate of emergency CD during ECV and ultimate mode of delivery
- Determine if an analgesic or anesthetic dose for ECV reduces the rate of emergency CD

METHODS

- Retrospective cohort study, approved by the Mayo Clinic IRB, on women who had an ECV performed at Mayo Clinic, Rochester, MN from June 1, 2018, to December 31, 2021
- Manual data collection included maternal demographics for age, body mass index (BMI), parity, and gestational age. Pre-procedural factors included placental location, use of terbutaline, vasopressor use, anesthesia method, and location of procedure.
- Neuraxial blocks were defined as analgesic or anesthetic based on the dose given. Intrathecal bupivacaine greater than 5mg, epidural lidocaine greater than 100mg, and epidural chloroprocaine greater than 150mg were considered anesthetic doses. Doses below these thresholds were defined as analgesia.
- Emergent CD were defined as cesarean deliveries performed within four hours of the procedure due to non-reassuring fetal status.
- Statistical analysis was done utilizing Blue Sky.

Patient Demographics

Overall	Overall (N=128)
Location of ECV	
Operating Room	10 (7.8%)
Labor Room	118 (92.2%)
Type of Anesthesia	
Analgesia	91 (71.1%)
Anesthesia	3 (2.3%)
None	34 (26.6%)
Maternal Age	31.0 (4.9)
Body Mass Index	29.8 (5.0)
Nulliparous	
Yes	51 (39.8%)
No	77 (60.2%)
Gestational Age at time of ECV	
<37	12 (9.4%)
37	90 (70.3%)
38	13 (10.2%)
39	10 (7.8%)
40	3 (2.3%)
Placental Location	
Anterior	54 (42.2%)
Posterior	52 (40.6%)
Lateral/Fundal	22 (17.2%)
Terbutaline	
Yes	118 (92.2%)
No	10 (7.8%)

Data are presented as n (%) except for continuous variable that are reported as mean (SD)

RESULTS

Characteristics and Outcomes by Anesthesia Type

	Analgesia (N=91)	Anesthesia (N=3)	None (N=34)	P Value
Location of ECV Operating Room Labor Room	9 (9.9%) 82 (90.1%)	1 (33.3%) 2 (66.7%)	0 (0.0%) 34 (100%)	0.042α
ECV Successful Yes No	45 (49.5%) 46 (50.5%)	2 (66.7%) 1 (33.3%)	21 (61.8%) 13 (38.2%)	0.452α
Vaginal Delivery* Yes No	39 (86.7%) 6 (13.3%)	2 (100%) 0 (0.0%)	19 (90.5%) 2 (9.5%)	1α
Emergent CD Yes No	1 (1.1%) 90 (98.9%)	0 (0.0%) 3 (100%)	0 (0.0%) 34 (100%)	1α

α = Fisher's exact; * following successful ECV

Characteristics and Outcomes by ECV Location

	Operating Room (N=10)	Labor Room (N=118)	P Value
Anesthesia Type Analgesia Anesthesia None	9 (90.0)%) 1 (10.0%) 0 (0.0%)	82 (69.5%) 2 (1.7%) 34 (28.8%)	0.042α
ECV Successful Yes No	4 (40.0%) 6 (60.0%)	64 (54.2%) 54 (45.8%)	0.514α
Vaginal Delivery* Yes No	4 (100.0%) 0 (0.0%)	56 (87.5%) 8 (12.5%)	1α
Emergent CD Yes No	1 (10.0%) 9 (90.0%)	0 (0.0%) 118 (100.0%)	0.078α

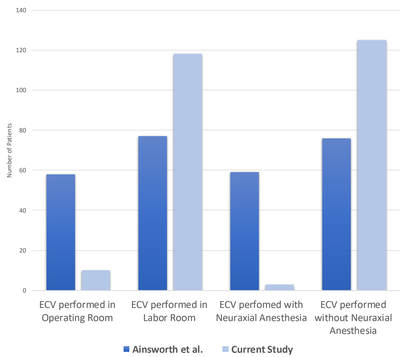
α = Fisher's exact; * following successful ECV

Outcome comparison of this study and previous study

	Ainsworth et al. (N=135)	Current Study (N=128)	P value
ECV Successful Yes No	70 (51.9%) 65 (48.1%)	68 (53.1%) 60 (46.8%)	0.9018α
Vaginal Delivery* Yes No	51 (72.9%) 19 (27.1%)	60 (88.2%) 8 (11.7%)	0.0312α
Emergent CD Yes No	5 (3.7%) 130 (96.3%)	1 (0.7%) 127 (99.3%)	0.2159α

α = Fisher's exact; * following successful ECV

Outcome comparison of this study and previous study



RESULTS

- No statistical association was found between neuraxial blockade type and emergent CD or between ECV location and emergency CD.
- The rate of emergency CD during this study period was 0.78%. The historical emergent CD rate prior to the practice change was 3.7%. The difference in emergent CD rates between studies was not statistically significant.
- There was a lower rate of emergent CD when comparing ECV procedures performed in the labor room in the current study compared to those performed in the OR in the previous study.
- Patients receiving an anesthetic dose were more likely to receive vasopressors.

LIMITATIONS

- The lower number of outcome events prevented statistical analysis that could have corrected for any confounding variables or quantified the impact of individual variables, such as procedure location and neuraxial anesthesia type.
- Reasons behind decisions for location and neuraxial anesthesia type that varied from standard practice could not be deduced from the electronic medical record.

DISCUSSION

- Lowering the dose of neuraxial medication and changing the location of the procedure from the OR to the labor room resulted in a lower emergency CD rate.
- There is no consensus on optimal dosing for neuraxial anesthesia during ECV, however the findings in this study, which are supported by the literature, show that increased doses are associated with maternal hypotension and the use of vasopressors, which can contribute to fetal instability.
- Temporary fetal heart rate abnormalities are not uncommon during ECV. The time and distance from the labor room to the OR may serve as natural barriers to reflexive cesarean deliveries in a patient with deterioration of fetal heart rate.
- These changes did not result in a lower ECV success rate.
- There may be clinical reasons why an anesthetic dose of neuraxial anesthesia or the OR should be used.

CONCLUSIONS

- Reducing the amount of neuraxial medication to an analgesic dose and moving the location of the procedure to the labor room reduced the emergent CD rate to <1% without impacting the success rate of the ECV.
- Although the decline between studies failed to reach statistical significance, we believe the practice change was effective as it reduced the emergency CD rate to the same level as that established in the literature and eliminated the association of neuraxial anesthesia with emergency CD.
- It was not possible to statistically determine which practice change had a larger impact, but it appears location of the procedure was more impactful.
- While this data was limited to one institution, it may help other institutions in developing their procedures or guide individual providers making clinical decisions.

REFERENCES