

Intrapartum Risk Factors Associated with Sequential Instrumental Delivery

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Background

- Instrumental deliveries reportedly account for 12.6% of births in Australia. ¹
- Australian Institute of Health and Welfare Report 2020¹
 - 7.4% of births were assisted by ventouse delivery
 - 5.2% of births were assisted by forceps
- 11.1% deliveries were successful instrumental at Royal Brisbane and Women's Hospital during research period 2017-2019.
 - 7.7% of vaginal births at RBWH were delivered by ventouse.
 - 3.4 % of vaginal births at RBWH were delivered by forceps.
- Instruments For Assisted Vaginal Birth: Cochrane Review 2021²
 - Failed delivery with any ventouse 13.7%
 - Failed delivery with any forceps 7.9%
- Careful selection of instrument is important as failure at this point may require sequential instrumental delivery or second stage caesarean.
- Both sequential and caesarean have increased maternal and neonatal morbidity compared to single instrument. ³



Aim

- Investigate intrapartum factors influencing success of single instrumental delivery compared to sequential instrumental delivery.
- Provide further information to assist clinicians regarding instrument choice and mode of delivery.

Methodology

Inclusion Criteria:

Live born
Singleton
Cephalic
Any gestation

Exclusion Criteria:

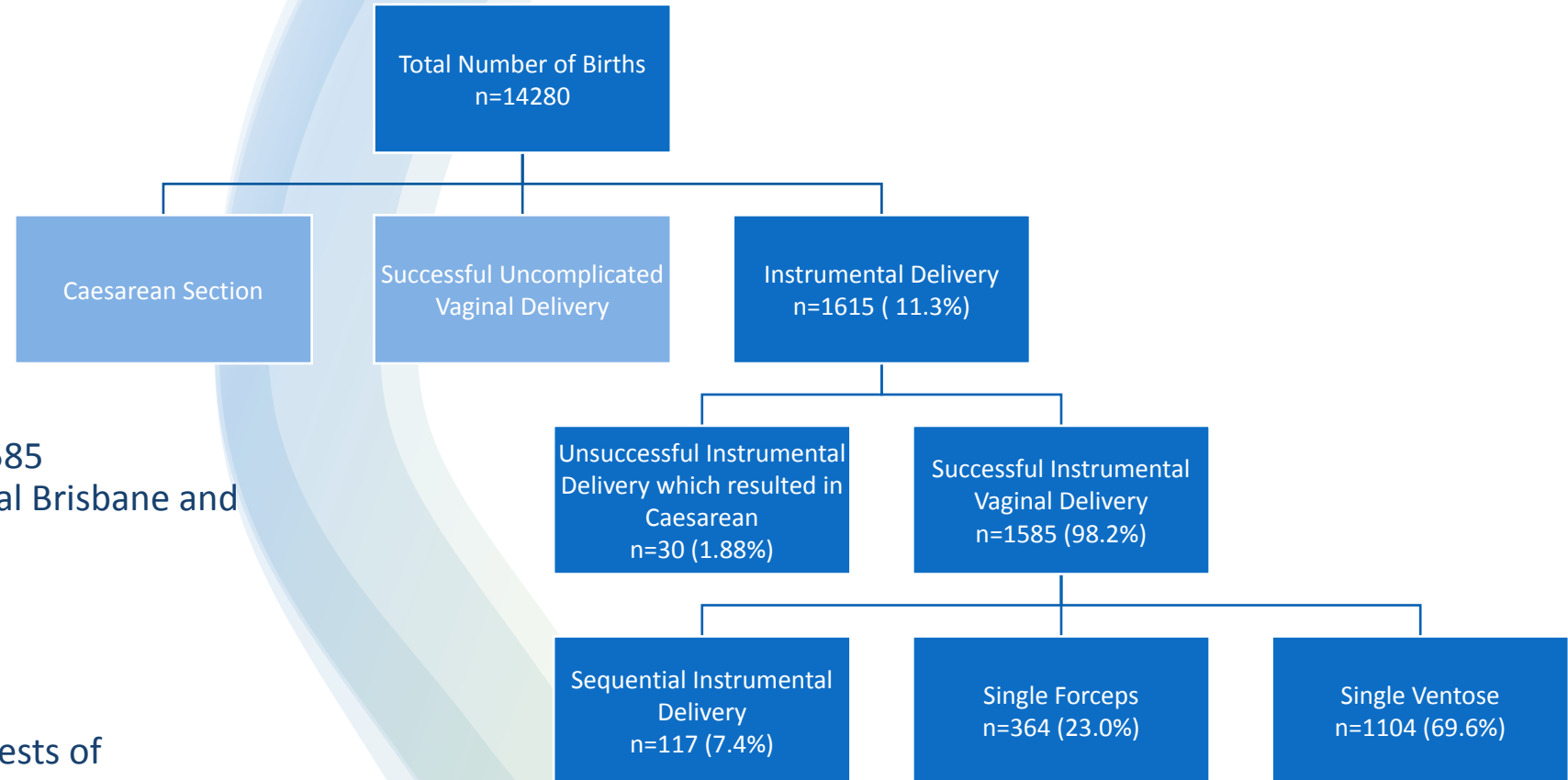
Stillborn
Malpresentation
Multiple Pregnancy

Design

Retrospective case-control audit, n= 1585
Conducted at quaternary hospital, Royal Brisbane and Women's Hospital, Australia.
Births during 2017-2019 inclusive.

Statistical Analysis

Statistical tests varied with data type.
Associations were examined using χ^2 tests of independence and Kruskal Wallis test.
Statistical significance set at a p-value < 0.05 (two-sided).
Stata version 15 (StataCorp, College Station, TX, U.S.A.) was used for analyses.

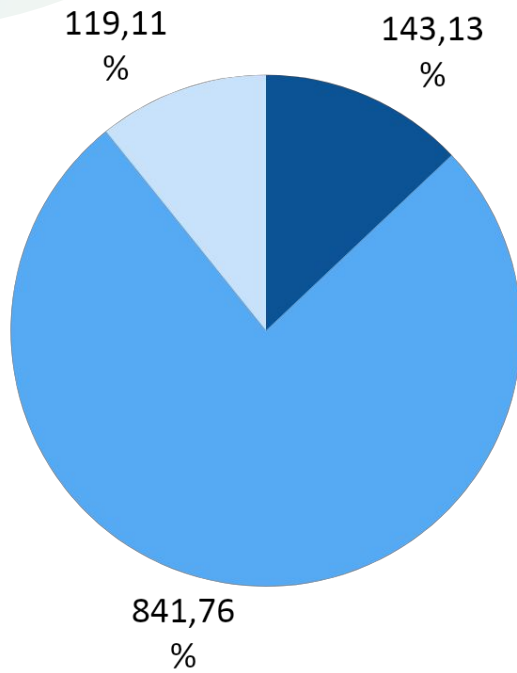


Demographics

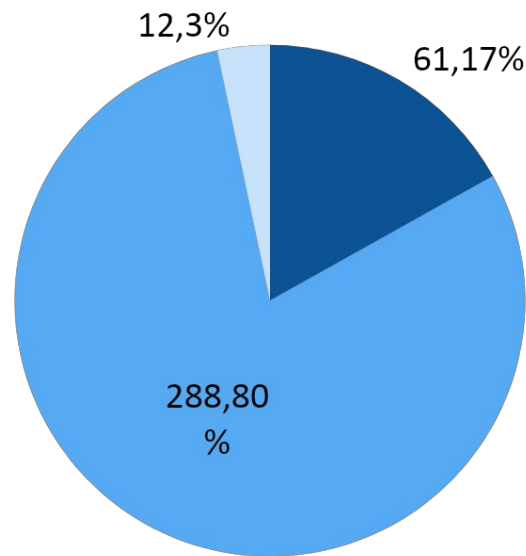
Average	Ventouse	Forceps	Sequential
n=	1104	364	117
Age (years)	30.09	30.16	29.44
Pre-pregnancy BMI	23.50	24.14	24.0
Parity			
Primiparous	927 (84.0%)	331 (90.9%)	106 (90.6%)
Multiparous	177 (16%)	33 (9.1%)	11 (9.4%)
Birthweight (grams)	3324.98	3358.80	3432.28
Infant Gender			
Male	594 (53.8%)	197 (54.1%)	73 (62.4%)
Female	510 (46.2%)	167 (45.9%)	44 (37.6%)
Average number of Pulls-1 st Instrument	2.16	2.02	2.74
Average number of detachments – 1 st instrument	0.006	0.005	0.68
Indication for Instrumental			
Failure to Progress	252 (22.8%)	135 (37.1%)	29 (24.8%)
Fetal Distress	737 (66.8%)	188 (51.6%)	58 (50.0%)
Maternal exhaustion	90 (8.2%)	26 (7.1%)	7 (6.0%)
Fetal Position abnormalities	17 (1.5%)	13 (3.6%)	3 (2.6%)
Other	8 (0.7%)	2 (0.6%)	20 (17.0%)

Accoucheur Grade

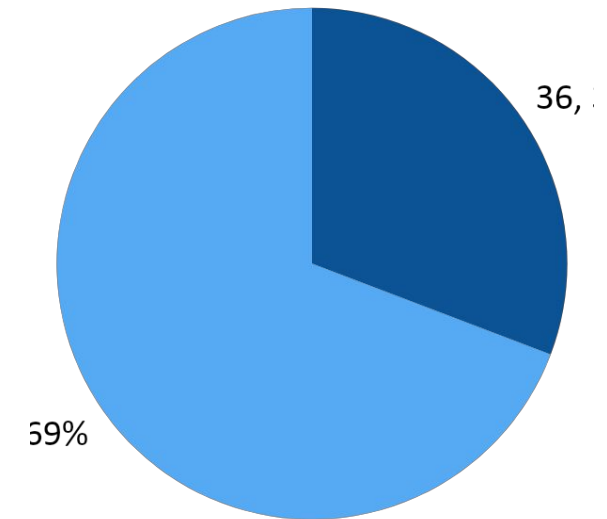
Ventouse



Forceps



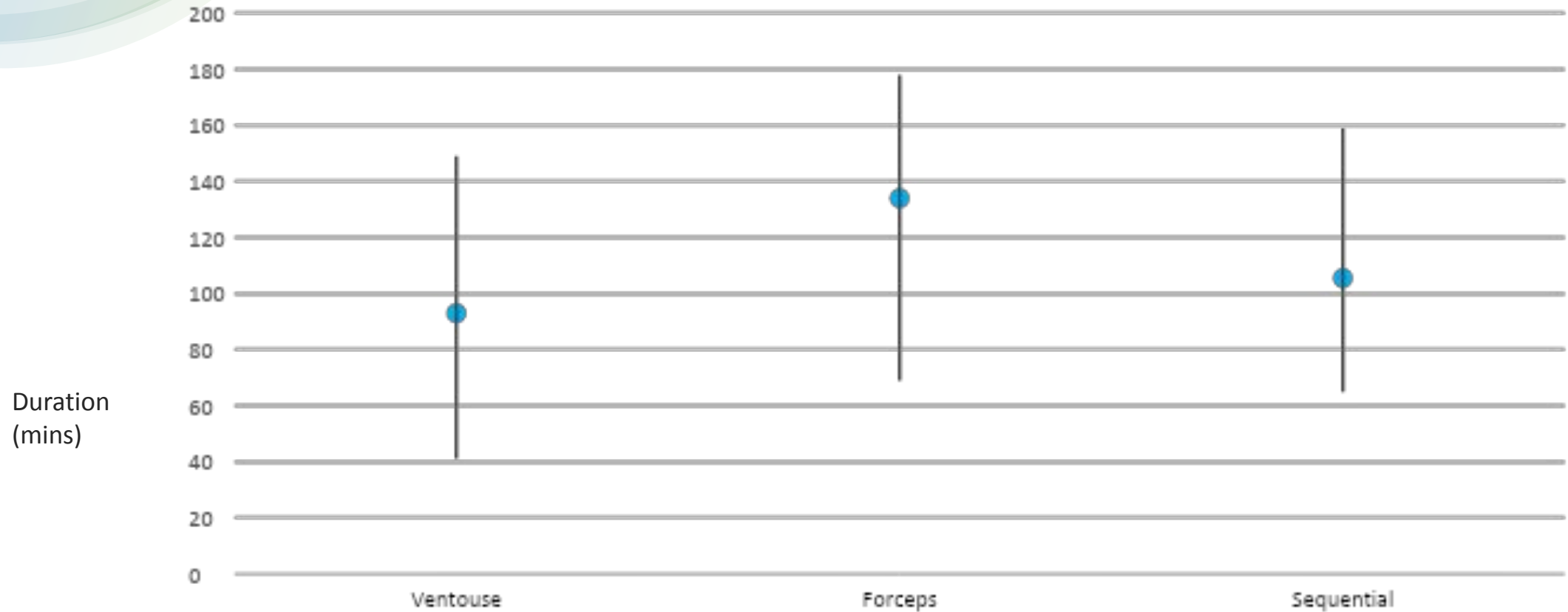
Sequential



■ Consultant ■ Registrar ■ PHO/RMO

p-value
<0.001

Duration of the Second Stage of Labour



Duration
(mins)

p-value
<0.001

Position at Instrumentation

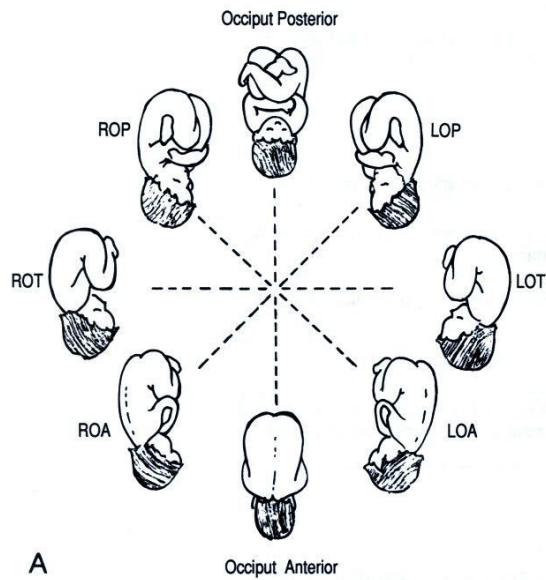
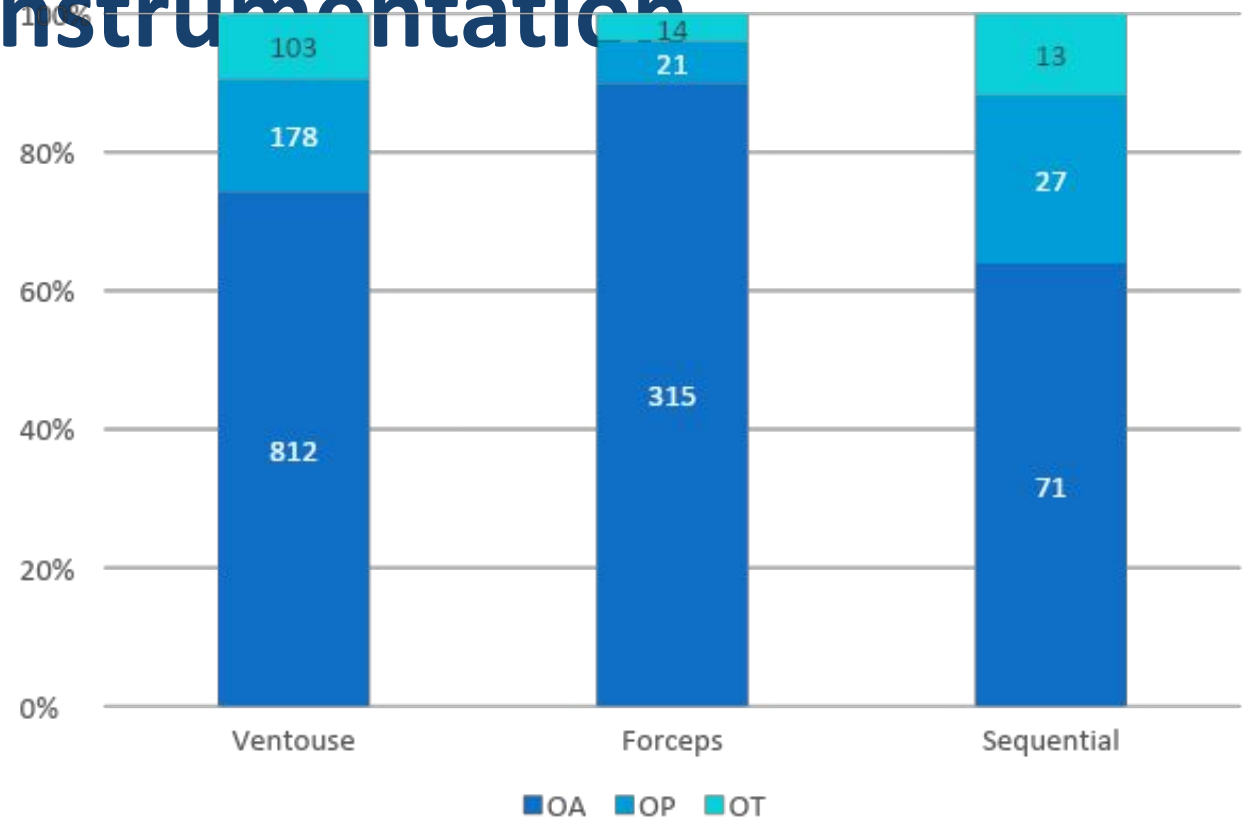


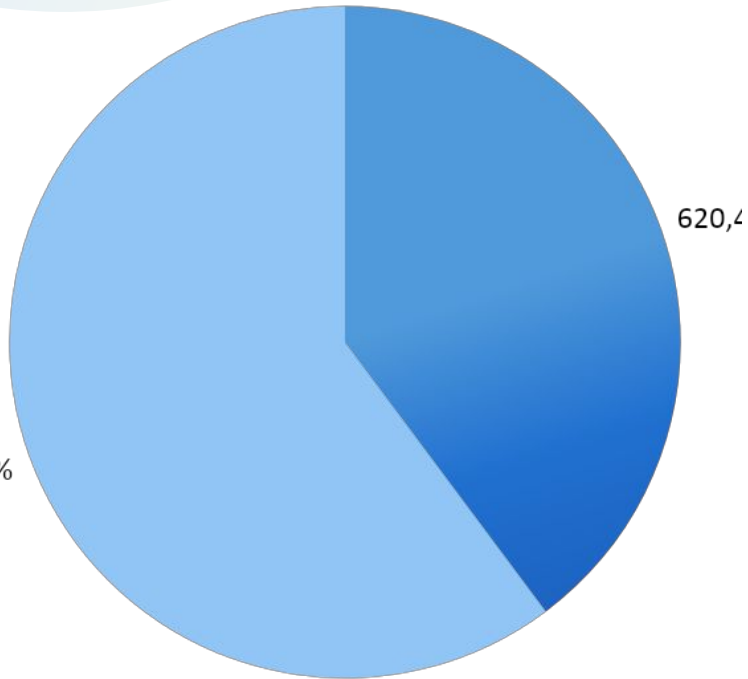
Figure 2.27A. Variety of fetal positions with vertex presentations. (Adapted with permission from Oxorn, H. (1986). *Oxorn-Foote Human Labor & Birth* (5th ed.) (p. 59) New York: Appleton-Century-Crofts.)



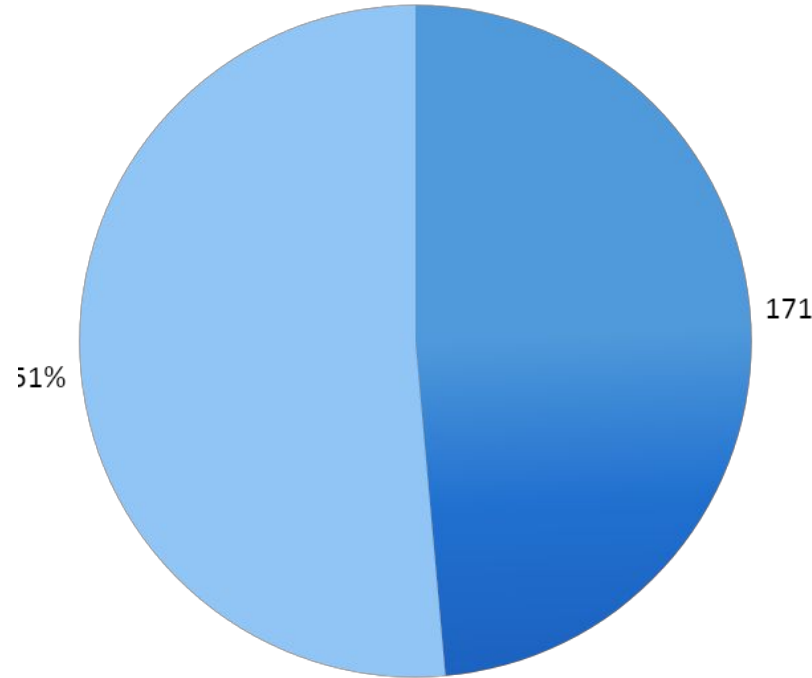
Factor	Overall n (%)	Ventouse n (%)	Forceps n (%)	Sequential n (%)	p-value
Position n=1554					
OA	1198 (77.1%)	812(74.3%)	315 (90.0%)	71 (64.0%)	
OP	226 (14.5%)	178 (16.3%)	21 (6.0%)	27 (24.3%)	
OT	130 (8.4%)	103 (9.4%)	14 (4.0%)	13 (11.7%)	
Position					<0.001
OP	226 (14.5%)	178 (16.3%)	21 (6.0%)	27 (24.3)	

Station at Instrumentation

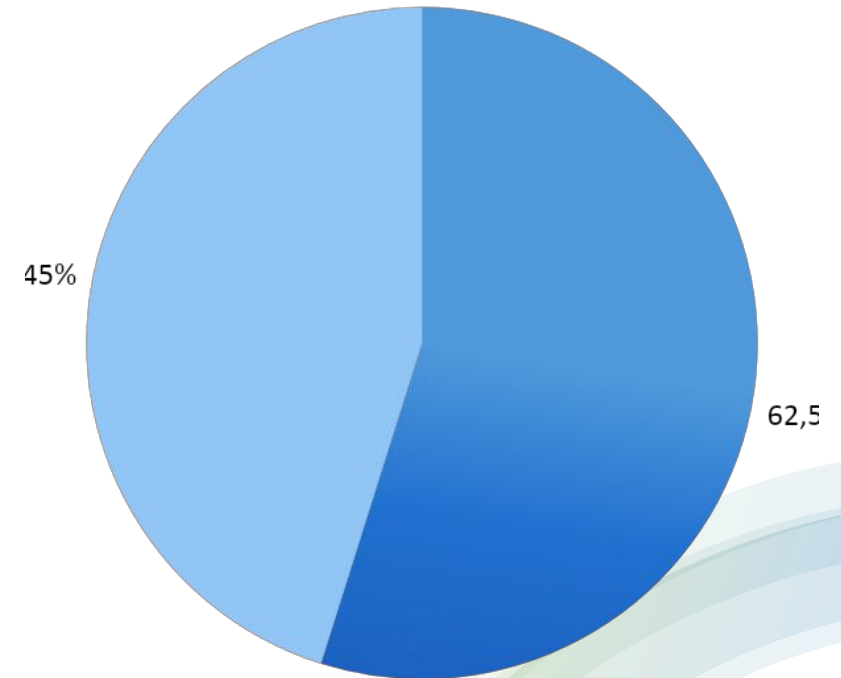
Ventouse



Forceps



Sequential



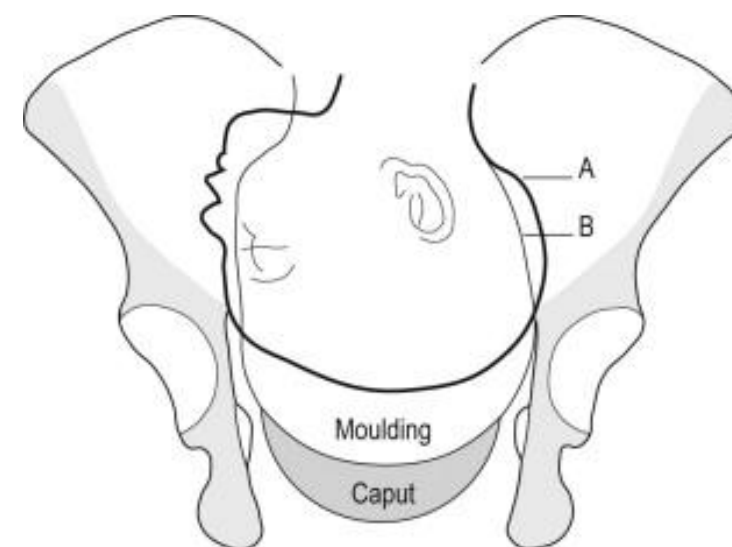
■ Mid/High ■ Low/Outlet

p-value

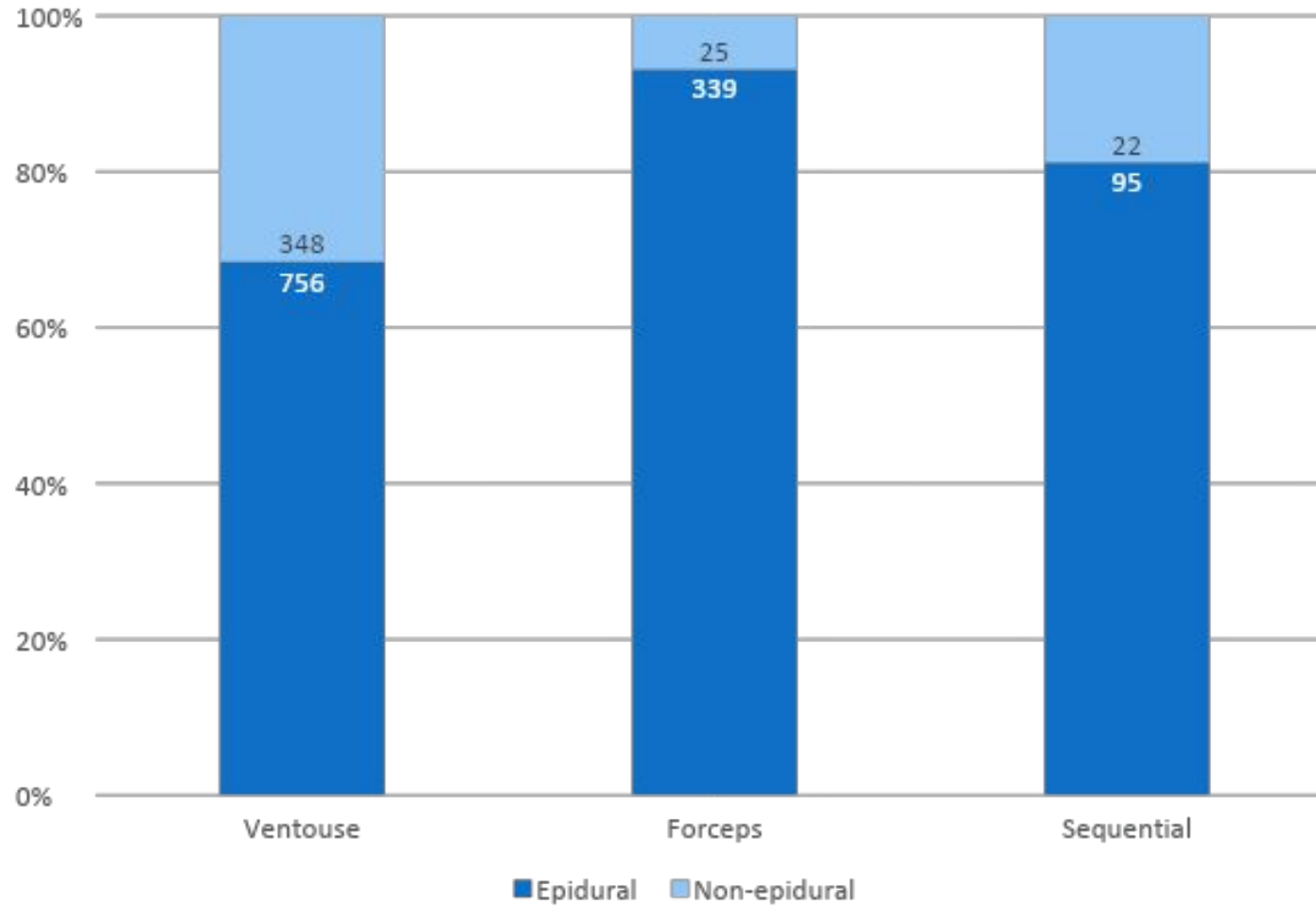
<0.001

Influence of Caput/Moulding

Factor	Overall n (%)	Ventouse n (%)	Forceps n (%)	Sequential n (%)	p-value
Caput Moulding n=1556					0.093
0	230 (14.8%)	176 (15.9%)	42 (12.3%)	12 (10.8%)	
1	642 (41.3%)	464 (42.0%)	133 (39.0%)	45 (40.5%)	
2	589 (37.9%)	406 (36.8%)	136 (39.9%)	47 (42.3%)	
3	95 (6.1%)	58 (5.3%)	30 (8.8%)	7 (6.3%)	

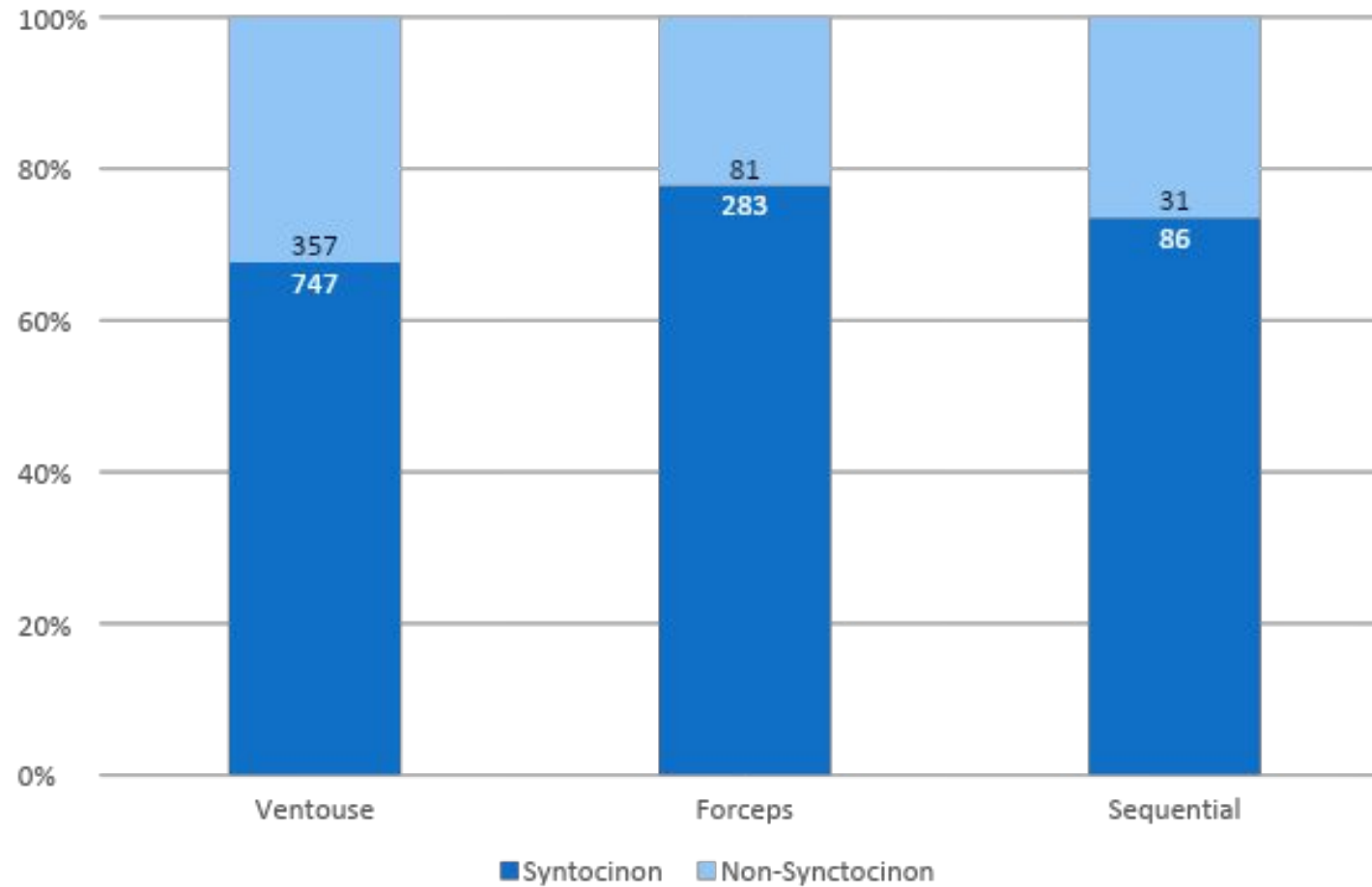


Analgesia at Delivery



p-value
<0.001

Augmentation of Labour with Syntocinon



p-value
<0.001



Summary

Statistically Significant Results

- In all groups, registrars were the majority accoucheur.
In sequential, consultant involvement doubles.
May represent delivery difficulty requiring more experienced accoucheur.
- Duration of labour between the 3 groups it is statistically significant.
Clinical significance unclear as may be confounded by many variables.
- OP position is a larger proportion of sequential group compared to single instrument.
May be reasonable to try ventouse first if other risk factors absent, considering 87% of ventouse deliveries were successful in OP population.
- Mid to high cavity position more common in sequential group.
Data suggests forceps may be the mode of choice for mid-high position.
- Epidural analgesia use was lowest in successful vacuum delivery and highest in successful forceps delivery.
- Syntocinon augmentation was lowest in successful ventouse delivery group and highest in successful forceps delivery.
Possibly, babies designated forceps required syntocinon to achieve progress of labour.

Not Statistically Significant Results

- Caput and moulding

Take Home Message

Our study has higher rates of OP position, mid/high cavity instrumentation and consultant involvement in sequential instrumental when compared to single instrument deliveries.

The operator should choose instruments most appropriate to individual maternal and foetal parameters. The more risk factors for failure present, the lower the threshold should be to consider a forceps delivery over a ventouse to avoid a possible sequential delivery or fully dilated caesarean section.

Clinicians should practice to their level of skill but aim to gain more experience under supervision.

Limitations to Medical Record audits

Data collected relies on accurate documentation and individual practitioners' subjective opinion on station, caput, time to event.

Patients with missing data were excluded so bias may be introduced though numbers were small

Clerical error in transferring data from chart to electronic medical records

Validation of electronic data from paper records would improve accuracy. 10% of sample is a recommended sample size to check.

References

Slides

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Discussion

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8. Sharma V, Colleran G, Dineen B, Hession M, Avalos G, Morrison J. Factors influencing delivery mode for nulliparous women with a singleton pregnancy and cephalic presentation during a 17-year period. Eur J Obstet Gynecol Reprod Biol. 2009 Dec;147(2):173-7. doi: 10.1016/j.ejogrb.2009.08.015. Epub 2009 Sep 18.