

Maternal and neonatal outcome with trial of operative vaginal delivery (TOVD) in theatre

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Citation

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Abstract

The objective of this study is to know the maternal and neonatal morbidity, along with characteristics affecting the success of trial of operative vaginal delivery (TOVD) in theatre. This is a retrospective study of TOVD in theatre. There were 196 cases of TOVD in theatre out of 2945 deliveries during the period of study with a total failure rate of 25.5% for all instruments used. Caesarean section and sequential instrumental deliveries were associated with more major complications than Neville-Barnes forceps and Kiwi ventouse cup but none with Moolgaoker and Kielland rotational forceps deliveries. However, the numbers may be small to make a conclusion that Moolgaoker and Kielland rotational forceps had the lowest failure rate (1/16 or 6%). Non-occipitoanterior positions significantly increased the incidence of TOVD ($p < .05$, two-tailed chi square test). A prospective study to compare between different instruments in TOVD over a longer period is needed.

INTRODUCTION

Operative vaginal delivery (OVD) rates remained stable at between 10 and 15% in the United Kingdom [2]. Operative vaginal births where there is a significant risk of failure should be considered a trial and conducted in a place where immediate recourse to caesarean section can be undertaken [2]. Although obstetricians normally face dilemmas in the second stage management of OVD with regard to the type of the instrument to be used and place of delivery, an OVD should not be attempted when the probability of success is low. It is important to select the right instrument and follow the standard rules of application; otherwise there is greater maternal and neonatal morbidity and consequent potential for litigation.

MATERIALS AND METHODS

This is a retrospective study of TOVD in theatre at Medway Maritime Hospital, Gillingham, Kent, UK. Between March 2006 and Feb 2007, 2945 deliveries occurred, excluding elective and semi-elective caesarean section deliveries. The theatre register during that period was reviewed, and all birth summaries for TOVD were retrospectively studied. Eighty-nine case notes were available for detailed review.

Statistical analysis used was Mean, Standard Deviation (SD), Chi square test analysis, one-way ANOVA.

RESULTS

There were 196 cases of TOVD in theatre out of 2945 deliveries during the period of study with a total failure rate of 25.5% for all instruments used (Table 1).

Figure 1

Table 1: Comparing the numbers of successful and failed TOVD in theatre

Instrument used	Successful TOVD	Failed TOVD
Kiwi ventouse cup	45	29
Neville-Barnes forceps (NBF)	54	8
Moolgaoker forceps	11	0
Keilland forceps	4	1
Metal ventouse cup	1	0
Silastic ventouse cup	1	0
Manual rotation	1	0
Sequential; Kiwi then NBF	22	12
Sequential; Kiwi then Wrigley's forceps	1	0
Sequential; Kiwi then Keilland forceps	2	0
Sequential; NBF then Keilland forceps	1	0
Sequential; Silastic cup then Keilland forceps	1	0
Sequential; Silastic cup then NBF	1	0
Sequential; NBF then Kiwi	1	0
Total	146	50

The mean gestational age for performing TOVD in theatre was 39 weeks and 4 days. The majority of patients were primiparous (95.9%). Spinal and epidural analgesia were used in the majority for TOVD (95.9%). Failure to progress was the only indication for TOVD in 85.4% of cases, followed by fetal distress (13.5%) and both in 5.6% of cases.

Induction of labour with prostaglandins and labour augmentation were occurred in 23.4% and 46.1% of women respectively.

Non-occipitoanterior positions significantly increased the incidence of TOVD ($p < 0.05$, two-tailed chi square test) The mean birth weight for successful TOVD was at 3476.73 grams with a SD of 523.80 grams and failed TOVD was at 3571.33 grams with a SD of 568.65 grams ($P > 0.05$, no significant difference).

Table 2 illustrates the major complications in 89 parturient's and 93 babies who had TOVD and in whom notes could be reviewed.

Figure 2

Table 2: Illustrate major complications with various TOVDs

CS	NBF	Kiwi	Moolgaoker	Kiellands	Sequential: ventouse then NBF
2 cases of postpartum haemorrhage (PPH) > 1000ml	3° perineal Tear	Severe head laceration	None	None	Fetal shoulder dystocia + humerus Fracture
Wound infection treated conservatively	2 cases of PPH > 1000ml	2 cases of PPH > 1000ml			3° perineal and cervical tears
Urinary retention with intermittent self catheterisation	Episiotomy breakdown requiring secondary repair	Evacuation of retained products of conception			PPH > 1000ml + blood Transfusion
Intra-op bleeding + blood transfusion					Severe fetal jaundice
Secondary admission with septic shock or requiring laparotomy or admission to intensive care unit					
Incisional hernia					
Severe fetal head laceration					

ANOVA for four independent samples (Table 3) to compare different fetal blood sampling results between: Kiellands, Moolgaoker, sequential instrumental delivery and CS showed that no significant difference in umbilical cord arterial or venous pH between groups (Two tailed p value is 0.07)

Figure 3

Table 3: Fetal blood samples for different modes of deliveries in the study: Kiellands, Moolgaoker, sequential instrumental delivery and CS.

Keiland forceps Vph	Moolgaoker forceps Vph	Sequential instrumental delivery Vph	CS Vph
7.170	7.290	7.150	7.260
7.290	7.350	7.210	7.311
6.930	7.330	7.310	7.000
	7.301	7.190	7.063
	7.260	7.266	7.190
		7.010	7.250
		7.250	7.250
		7.200	7.154
		7.300	7.196
			7.300
			7.340
			7.170

Moolgaoker and Kielland rotational forceps had lower failure rate (6%), compared to NBF (12.5%), Kiwi (39.2%), and Sequential instrumental delivery (29.3%).

ANOVA analysis between the different means has shown significant longer hospital stay for sequential instrumental deliveries and CS ($p = 0.017$), with an average stay of 3.88 and 5.23 days respectively.

DISCUSSION

There are no absolute criteria for a TOVD in theatre [3] but the RCOG [1] has suggested that higher failure rates are associated with:

1. Maternal body mass index greater than 30
2. Estimated fetal weight greater than 4000 g or a clinically big baby
3. Occipito-posterior position
4. Mid-cavity delivery or when 1/5 head palpable per abdomen.

It had been reported earlier that between 2% to 5% of all instrumental deliveries are undertaken in theatre with preparations made for immediate caesarean section

[4, 5]. Patients need to be reassessed again in theatre under regional analgesia and a final decision made regarding the mode of delivery and the appropriate selection of instrument. Failure rates of OVD range from 16% to 20% cases [6, 7]. The failure rate in our study was at 25.5% and that the TOVD with Kiwi has had the lowest success rate between instruments (Failure rate of 39.2%).

The experience of the surgeon affects the outcome of OVD, but it is difficult to compare the success rates for different

surgeons as they use different instruments.

Moreover, an experienced obstetrician is likely to have a higher success rate due to careful patient selection. A cautious less experienced operator may also have a high success rate by performing most of his/her OVD as trials in theatre [8]. In a recent prospective case-control study it has been shown that formal training and education was associated with improved safety of instrumental vaginal delivery for both the mother and the baby [6].

There is higher maternal and fetal morbidity after failed sequential instrumental delivery [9]. Although we found that

CS and sequential instrumental deliveries were more associated with complications than with the NBF and Kiwi ventouse cup, this may be due to selection bias. Therefore, we cannot conclude with enough confidence that the latter statement is true.

CONCLUSION

A larger prospective study to compare the different instruments in TOVD is needed. Non-occipitoanterior positions significantly increased the incidence of TOVD Failure rate of 25.5% for all instruments used.

References

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