Original Article

Effectiveness and Safety of Fundal Pressure in Second Stage of Labour

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Abstract

Objective: To evaluate the effectiveness and safety of fundal pressure (Kristeller manoeuvre) in second stage of labour at a tertiary care Hospital (KGH).

Methodology: This descriptive case series study was conducted at the Gynaecology and Obstetrics department of Kharadar General Hospital, Karachi, from July 2022 to December 2022. The study included women with singleton pregnancies at 37 weeks or more gestational age, who had reached the second stage of labor, regardless of age or parity. Fundal pressure was applied through manual or instrumental means to the maternal abdomen in the direction of the birth canal. Effectiveness and safety were measured by successful normal vaginal deliveries (NVD) and reduced complications. Data were collected using a self-designed study proforma.

Results: The participants in the study had an average age of 23.51 ± 4.11 years, and the mean gestational age was 38.29 ± 1.88 weeks. Of the cases, 40.6% underwent induced labor (IOL), while 59.4% experienced spontaneous labor. All 64 study subjects, successfully delivered by NVD and no instances of instrumental deliveries or cesarean sections were observed. Out of all, only two cases had degree-I perineal tears, and one case had a degree-II perineal tear. Only two women experienced postpartum hemorrhage (PPH), and one case was found with fetal distress. No significant associations were observed between PPH and perineal tears with age, parity, and booking status in the given sample ($p > 0.05$).

Conclusion: Fundal pressure observed with minimal complications and successful normal deliveries. However, the findings cannot be unequivocally recommended for the use of fundal pressure due to several limitations. To establish more robust and conclusive evidence, further large-scale studies are recommended.

Key words: Seconds stage of labour, fundal pressure, NVD.

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Introduction

Maternal mortality and stillbirth remain substantial global concerns, with approximately 295,000 mothers losing their lives and 2.6 million stillborn babies occurring annually across the world.[1,2] In an ideal scenario, maternity care procedures should align with the most current evidence and clinical recommendations. Nonetheless, there are acknowledged disparities between the recommended care and the actual practices in numerous healthcare settings.[1,3] Extended duration of the second stage of labor has been linked to unfavorable results for both the mother and the baby. The second phase of labor spans from the full dilatation of the cervix to the fetus's delivery. This stage involves critical moments when the fetus descends and rotates while making its way through the birth canal. In the majority of typical labors, the descent process initiates during the deceleration phase of cervix dilatation as the cervix gradually moves upward around the fetal presenting part.[4] In the second stage of labor, fundal pressure entails manually applying pressure to the uppermost region of the uterus, directed towards the birth canal.[5] This is done in an effort to aid in natural vaginal delivery and reduce the chances of an extended second stage or the necessity for operative delivery.

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Fundal pressure has also been administered through the use of an inflatable belt.[5] Uterine fundal pressure involves applying pressure to the uterine fundus in a direction toward the vagina during the second stage of labor, aiming to facilitate or speed up the onset of a natural vaginal birth.[1,6] The second stage of labor tends to be of greater length among nulliparous females in compared multiparous women. Nonetheless, when the second stage becomes excessively prolonged, it may necessitate immediate medical intervention in order to enhance the well-being of the baby during birth.[5] Fundal pressure has also been administered through the utilization of an inflatable girdle. A survey conducted in the United States revealed that 84% of the participants employed fundal pressure within their obstetric facilities.[7] Fundal pressure is an intervention designed to reduce the duration of the second stage of labor by applying pressure to the upper part of the uterus, known as the fundus, at an angle of approximately 30˚-45˚ using the hand or with the assistance of an inflatable abdominal binder.[8]

The primary goal of this technique is to facilitate the descent of the fetus through the birth canal.[9] Fundal pressure during childbirth is a commonly employed technique to accelerate the delivery process in situations involving fetal distress, labor difficulties, and maternal fatigue.[10] Its prevalence is often underestimated, making it challenging to gauge accurately. The practice is a subject of considerable controversy, with many nations discontinuing its use due to potential risks.[10] However, some healthcare providers regard it as a viable and effective option in critical obstetric emergencies.[10] Recently Hayata E et al, observed that the after application of uterine fundal pressure there were no instances of uterine rupture, severe adverse events resulting in prolonged hospitalization, or maternal fatalities recorded.[11] While Papadakis K et al observed the application of uterine fundal pressure adversely impacts both birth results and the oxygen saturation levels of newborns.[10] Due to above controversy and lack of local strong evidence, this study has been done to evaluate the Effectiveness and safety of fundal pressure in second stage of labour.

Methodology

This descriptive cases series study was done at Gynaecology and Obstetrics department of Kharadar General Hospital, Karachi. Duration of study was six months from July 2022 to December 2022. All the women with singleton pregnancy with 37 weeks or gestational age, reaching 2nd stage of labour of either age and parity were included. Women prepared for elective caesarean sections, fetal anomalies, antepartum haemorrhage, patients with diagnosis of IUD or breech presentation, chronic viral hepatitis, jaundice, coagulation abnormalities, macrosomia and patients with fetal distress or other immediate obstetric complications were excluded. Informed consent was obtained from all study subjects, and the study's objectives and purposes were explained. Patients were counselled that their data would be anonymized during analysis and reporting. No personal information will be disclosed in any published reports or presentations. Participants have the right to withdraw their consent at any time, and this will not affect their medical care. After taking demographic information and clinical examination, patients were undergone fundal pressure. Fundal pressure was done by use of manual or instrumental pressure on maternal abdomen in the direction ofthe birth canal. Fundal pressure was carried out in all the cases by the senior gynaecologist having minimum experience of 5 years or more. The outcomes for effectiveness and safety were measured in terms of the duration of the second stage of labor until vaginal birth and fetal and maternal complications such as perineal trauma, fetal distress, and postpartum hemorrhage etc. All the information was collected via self-made study proforma. SPSS version 26 was used for purpose of analysis.

Results

The average age of the participants was reported as 23.51± 4.11 years and mean gestational age was 38.29 ± 1.88 weeks. 58 individuals (90.6%) were booked, while 6 individuals (9.4%) were un-booked. 26 individuals (40.6%) undergoing induced labor (IOL) and 38 individuals (59.4%) underwent spontaneous labor. The largest proportion of participants (56.3%) were Nulliparous. Other categories include parity-1 (12.5%), Parity -2 (14.1%), Parity -3 (9.4%), Parity -5 (4.7%), and Parity -8 (1.6%).

Regarding the mode of delivery (MOD), all 64 participants underwent a Normal Vaginal Delivery (NVD) with the application of the Kristeller manoeuvre. No instances of instrumental deliveries or Cesarean sections were observed in this sample. Out of all 92.2% of participants experiencing no tears, while only two cases had degree-I perineal tears and one case had degree-II perineal tear. Only 2 women had PPH and one cases found with fetal distress. Table I

Table I: Effectiveness and safety of fundal pressure in second stage of labour. (n=64)

Safety and effectiveness		Statistics	
MOD	NVD (Kristeller manoeuvre)	64	100.0%
	Instrumental	00	00
	C-section	00	00
Perineal tear	No	59	92.2%
	Degree -I	02	03.1%
	Degree -II	01	01.6%
	Degree -III	00	00
PPH	Yes	2	03.1%
	No	62	96.9%
Fetal distress	Yes	1	01.6%
	No	63	98.4%

Table II: Frequency of PPH according to age, parity and booking status (n=64)

Variables		PPH		Total	P-value
		Yes	No		
Age groups	18-25 years	2	45	47	0.688
		3.1%	70.3%	73.4%	
	26-30 years	0	13	13	
		0.0%	20.3%	20.3%	
	31-40 years	0	4	4	
		0.0%	6.3%	6.3%	
Parity	Nulliparous	2	34	36	0.488
		3.1%	53.1%	56.3%	
	Parity 1-3	0	23	23	
		0.0%	35.9%	35.9%	
	Parity 4-5 or >5	0	5	5	
		0.0%	7.8%	7.8%	
Booking status	Booked	2	56	58	0.644
		3.1%	87.5%	90.6%	
	Un-booked	0	6	6	
		0.0%	9.4%	9.4%	

There was no significant association observed of PPH and perineal tear with age, parity and booking status in the given sample (p->0.05). Table II & III

Table III: Frequency of perineal tear according to age, parity and booking status (n=64)

Variables		PERINEAL TEARS				p-value
		No	Degree -1	Degree -II	Degree-III	
Age groups	**18-25 years**	43	2	1	0	0.958
		67.2%	3.1%	1.6%	0.0%	
	26-30 years	13	0	0	0	
		20.3%	0.0%	0.0%	0.0%	
	31-40 years	4	0	0	0	
		6.3%	0.0%	0.0%	0.0%	
Parity	**Nulli-parous**	32	2	1	0	0.768
		50.0%	3.1%	1.6%	0.0%	
	Parity 1-3	23	0	0	0	
		35.9%	0.0%	0.0%	0.0%	
	Parity 4-5 or >5	5	0	0	0	
		7.8%	0.0%	0.0%	0.0%	
Booking status	**Booked**	55	1	1	0	0.244
		85.9%	1.6%	1.6%	0.0%	
	Un-booked	5	1	0	0	
		7.8%	1.6%	0.0%	0.0%	

Discussion

Fundal pressure, technique is utilized with the primary aim of assisting in the progression of spontaneous vaginal birth. By exerting pressure on the fundus of the uterus, practitioners seek to enhance the descent of the fetus through the birth canal, potentially mitigating the duration of the second stage of labor. The purpose of this study was to assess the effectiveness and safety of fundal pressure during the second stage of labor. The study included 64 cases with an average age of 23.51 ± 4.11 years and a mean gestational age of 38.29 ± 1.88 weeks. In comparison, a study by Okumus F et al[12] found that the mean age of women was 26.8 ± 5.3 years, with a mean gestational age of 39.0 ± 1.2 weeks, and these women had undergone various interventions, including fundal pressure. Another study conducted by Okumuş F et al[13] reported that the average maternal age was 27.54 ± 4.52 years, and the average gestational age was 39.63 ± 0.81 weeks. Similarly, Pinar S et al[14] also found that the mean age of women undergoing fundal pressure was 26.62 ± 5.71 years, with an average gestational age of 39.17 ± 1.16 weeks.

In this study 58 individuals (90.6%) were booked, while 6 individuals (9.4%) were un-booked. 26 individuals (40.6%) undergoing induced labor (IOL) and 38 individuals (59.4%) underwent spontaneous labor. The largest proportion of participants (56.3%) were Nulliparous. Comparatively Furrer R et al[15] reported that the 36% women were primiparous in the group subjected to uterine fundal pressure (UFP), and 54% primiparous women in control group. Additionally, in their study, 23.9% of women who had spontaneous vaginal deliveries and underwent fundal pressure received induction of labor.[15] Mohamed HS et al[16] inconsistently found multiparous women in majority 63%. However, Okumus F et al[12] reported that 29.6% of women underwent induction of labor, and in their study, all the women were primiparous.

In this study in terms of effectiveness, all 64 participants underwent a normal Vaginal delivery with the application of the Kristeller manoeuvre, no any instances of instrumental deliveries or cesarean sections were done in study population and as per the safety 92.2% of participants experiencing no tears, while only two cases had degree-I perineal tears and one case had degree-II perineal tear. Only 2 women had PPH and one cases found with fetal distress. Furthermore, there was no significant association observed of PPH and perineal tear with age, parity and booking status in the given

sample (p->0.05). Study by Hayata E et al[11] supported our findings, where they did not observe adverse event among mothers and Newbons. However, Akpınar G et al[17] concluded that applying pressure to the uterine fundus has an adverse impact on both birth outcomes and neonatal oxygen saturation. In the comparison of this study a meta-analysis and systematic review indicated that employing fundal pressure during the second stage of labor was linked to a reduction of 20 minutes in the duration of labor, a decrease of 0.03 in umbilical artery pH, and a slightly elevated, though not statistically significant, likelihood (4.9% vs. 0.7%) of Apgar scores < 7 at 5 minutes.[18] Importantly, there was no observed impact on maternal lacerations, neonatal trauma, or admission to the neonatal intensive care unit when compared to cases where fundal pressure was not repeatedly applied.[18] However, Furrer R et al[16] higher rate of maternal and fetal complications compared to our findings among women undergoing fundal pressure. Inconsistently Asti P et al[19] also reported that the uterine fundal pressure maneuver was associated with an elevated occurrence of both maternal and neonatal complications, the incidence of neonates requiring admission to the neonatal intensive care unit was higher 28.3% in the groups where uterine fundal pressure was applied, while it was 4.9% in the groups where this maneuver was not used, and average Apgar scores at both the first and fifth minutes were greater in the group that did not undergo uterine fundal pressure, compared to the group that received uterine fundal pressure.[19] However, many other earlier and recent studies did not support the use of fundal pressure.[20-24]

This study showed minimal complications and successful normal deliveries, potentially attributed to the application of pressure by experienced healthcare providers. The exclusion of even minimally risky patients, careful patient selection, exclusion of macrosomia, and the application of steady and gentle fundal pressure may have contributed to the positive outcomes observed. Despite these favorable results, it is essential to acknowledge the conflicting evidence from other studies, with some supporting the use of fundal pressure while others most of the studies highlighting increased fetal and maternal complications. This study, however, cannot be unequivocally recommended for the use of fundal pressure due to several limitations, including a very limited sample size, lack of comparison with a control group, and the absence of fetal weight analysis. To establish the technique's true benefits and effectiveness, it is imperative to conduct more comprehensive and longitudinal studies that address these limitations and provide a more robust assessment of the safety and efficacy of fundal pressure in the second stage of labor

Conclusion

This concluded minimal complications and successful normal deliveries. However, the findings cannot be unequivocally recommended for the use of fundal pressure due to several limitations, including very limited sample size, the absence of a comparison with a control group, a lack of fetal weight analysis, and the lack of support from local literature. Therefore, to establish more robust and conclusive evidence, further large-scale studies are recommended.

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