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Are all Kristeller manoeuvre's forbidden?

Gianluca Raffaello Damiani^{1,*}, Marco Cerbone¹, Daniele Di Gennaro¹, Antonella Vimercati¹, Giuseppe Lupica¹, Andrea Tinelli², Maria Bardi¹, Edoardo Di Naro¹, Miriam Dellino¹, Maria Gaetani¹, Antonio Malvasi¹

¹Department of Biomedical and Human Oncological Science (DIMO), University of Bari, Policlinico of Bari, Bari, Italy.

²Department of Obstetrics and Gynecology, "Veris delli Ponti" Hospital, Scorrano, Lecce, Italy.

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*Corresponding author: Gianluca Raffaello Damiani, M.D. Department of Biomedical and Human Oncological Science (DIMO), University of Bari, Policlinico of Bari, piazza Giulio Cesare 11, 70124 Bari, Italy.
Email: damiani14@alice.it.
ORCID: 0000-0003-0614-8068.

ABSTRACT

Objective. Kristeller manoeuvre was first described by Samuel Kristeller in Berlin in 1867, in literature named "Fundal pressure" (FP), because the original manoeuvre can be performed in the second stage of labour. The aim of the narrative review is to point out that the FP manoeuvre isn't prohibited by all the authors even though there are conflicting opinions in clinical practice and in literature.

Materials and Methods. A literature search of the last 35 years was performed on PUBMED, SCOPUS, EMBASE, MEDLINE, GOOGLE SCHOLAR, with the aim of clarifying the real advantages or disadvantages of this manoeuvre and at the same time, to identify in which situations it can be done safely due to the lack in literature, taking into account that more complications about maternal and foetal injuries related to FP are not reported in literature, for medical legal problems.

Results. These findings highlight the importance of obtaining informed consent from women before administering FP to ensure the protection of women's autonomy during the birthing process. The impact on the maternal perineum remains uncertain based on our findings.

Through a regression analysis model, author determined that only the duration of the second stage, neonatal weight, and the use of episiotomies were significantly associated with the Kristeller manoeuvre.

Conclusions. It is authors' belief that this manoeuvre should be reported into the international Guidelines with the aim of having strict but clear indication for its application and reducing future legal litigations.

INTRODUCTION

Kristeller manoeuvre first described by Samuel Kristeller in Berlin in 1867, in literature is named

"Fundal pressure" (FP), an original manoeuvre that could be performed in the second stage of labour. All the manoeuvres have a single purpose which is to apply pressure on the fundus of the uterus to

allow for the progression of the foetal head into the birth canal [1-3]. In the original procedure of Kristeller, the patient lay in the supine position and the operator placed his hands on the fundus and sides of the uterus. Steele described a combine manoeuvre of downward pressure with the palms on the fundus with lateral pressure using the fingers, the uterus was brought into correct relation with the pelvic axis and the fetus was forced down into the canal of birth [4]. From Kristeller to modern obstetrics practice many FP manoeuvres are described in clinical obstetrics practice and the use of a device called "inflatable belt" [5-6]. There isn't sufficient evidence to conclude the beneficial or harmful effects of FP, either manually or by inflatable belt.

This narrative review aim is to evidence that the FP manoeuvre isn't prohibited by all the authors even though there are conflicting opinions and at the same time to identify in which situations in which it can be performed safely [7]. The authors carried out a literature search of the last 35 years on PubMed, Scopus, Embase, Medline, Google Scholar, with the aim of looking at the studies for and against [8].

MATERIALS AND METHODS

A literature search of the last 35 years was performed on PubMed, Scopus, Embase, MEDLINE, Google Scholar, with the aim of clarifying the real advantages or disadvantages of this manoeuvre and at the same time, to identify in which situations it can be done safely due to the lack in literature, taking into account that more complications about maternal and foetal injuries related to FP are not reported in literature, for medical legal problems. Strength of this study is the very big quantity of data from the cited studies summarized in two distinct tables while limitation of the study is the under-reporting of the manoeuvre for fear of litigations causing difficulty to generalize findings to population.

RESULTS

Negative opinions

In a review of Verheijen EC *et al.* there is no evidence whether FP is harmful or beneficial. In his study, FP manoeuvre was practiced using an inflatable belt device applied during the second stage

of delivery. This simple device is wrapped around the woman's abdomen above the level of the uterine fundus and secured with Velcro. A sensor on the tocotransducer, which is also fastened around the woman's abdomen, picks up uterine activity during a contraction, and via a microprocessor controller, automatically causes the belt to inflate to a maximum of 200mmHg for 30s. Results showed no increase in vaginal delivery rate when patients were on epidural analgesia. Furthermore, it must be remembered that there are insufficient data about foetal outcomes.

Regarding perineal damage, this author reports inconclusive evidence [9]. In this study, patients were not blinded, and this factor could have influenced outcomes. It seems indeed, that the belt may have been perceived by patients as 'doing the work' so women have pushed more lightly, and the midwives have encouraged them less enthusiastically. But this is a real representation of what happens outside a research setting, where there is no blinding either.

Takmaz, in his study, concludes that FP in the second stage of delivery is associated with a doubled risk of LAM (Levator ani muscle) defect whether mono or bilateral and a loss of anterior vaginal wall support. These defects were already visible in patients when a 3D ultrasound was made 36 hours after delivery. Patients indeed showed a higher value of anteroposterior hiatal diameter during the Valsalva manoeuvre or even rest [10].

Regarding FP, Merhi affirms that physicians should use an alternative method to shorten the second stage of labour because there is poor evidence of the efficacy and safety of this procedure, on the contrary, maternal and foetal adverse effects are well documented, and the risk of a potential litigation is always present. One solution could be just waiting for the passive descent of the foetal head even if the foetal status is not reassuring. Episiotomy should be avoided considering post-partum pain and dyspareunia. Epidural analgesia indeed, with its known lengthening action on the second stage duration, should also be used mindfully privileging analgesics rather than anaesthetics [11].

Youssef in his prospective case-control study concluded that the FP increased more of the double risk of Levator ani muscle avulsion in primiparous patients (**Table 1**). Identifying and preventing LAM avulsion is fundamental considering the role this condition plays in subsequent anterior and central compartment pelvic organ pro-

Table 1. Results according to favourable, contrary and neutral evidences of analysed studies.

Author(s) and year [Study]	Study type	Findings/conclusions
Hofmeyr GJ, <i>et al.</i> 2018 [7]	Multicentre randomized, unblinded, controlled Trial	No benefit was identified from gentle pushing in the second stage
Verheijen EC, <i>et al.</i> 2017 [9]	Systematic Review	No evidence that this maneuver raised numbers of vaginal births
Takmaz T, <i>et al.</i> 2021 [10]	Cross-sectional Study	Second stage duration was significantly shorter in the control group compared to the fundal pressure group. Fundal pressure was identified as the only independent predictor of LAM defect
Mehri ZO, <i>et al.</i> 2005 [11]	Review	The extant literature does not demonstrate any benefit and hints at potentially serious risks
Youssef A, <i>et al.</i> 2019 [12]	Prospective case-control Study	Women who underwent the manoeuvre had a significantly higher risk of LAM avulsion
Moiety FM, <i>et al.</i> 2014 [13]	Prospective observational Study	Study found a significant increase in the admission to NICU after fundal pressure application
Abedzadeh-Kalahroudi M <i>et al.</i> 2019 [14]	Cross sectional Study	Perineal trauma odds found in this study are very high with this manoeuvre
Farrington E, <i>et al.</i> 2021 [15]	Systematic Review and Meta-analysis	Increased rates of perineal damage, shoulder dystocia, neonatal fractures, brachial plexus injuries, higher rates of NICU admission
Matsuo K, <i>et al.</i> 2009 [17]	Cross-sectional Study	Uterine fundal pressure manoeuvre during the second stage of labour increased risk of severe perineal laceration.
Wei SC, <i>et al.</i> 2006 [19]	Case report	Assisted fundal pressure during painful delivery can be traumatic and results in uterine rupture.
Furrer R, <i>et al.</i> 2016 [20]	Retrospective cohort Study	Fundal pressure is associated with increased occurrence of shoulder dystocia and foetal acidosis
Mahendru R, <i>et al.</i> 2010 [21]	Pilot Study	No significant differences in second stage duration. Significant adverse findings: one case of retained placenta, uterine prolapse and perineal injuries
Pan HS, <i>et al.</i> 2002 [22]	Case Report	Risk factors for uterine rupture include weakness of the uterine wall and fundal pressure.
Gross SJ, <i>et al.</i> 1987 [23]	Retrospective Analysis	Fundal pressure, in the absence of other manoeuvres to resolve dystocia, resulted in a 77% complication rate and was strongly associated with orthopaedic and neurologic damage.
Rubashkin N, <i>et al.</i> 2019 [24]	Qualitative Inquiry	Providers made women's refusal more difficult. Women did not experience the KM as gentle, and the force of the procedure made their refusal nearly impossible.
Sentilhes L, <i>et al.</i> 2016 [25]	Peer Review	In shoulder dystocia, it is recommended to avoid fundal pressure due to higher brachial plexus injury risk
Kanninen T, <i>et al.</i> 2022 [26]	Systematic Review	20-minute decrease in the length of labour. No significant difference in rates of neonatal trauma, vaginal/perineal laceration, cervical laceration, episiotomy, caesarean section, operative vaginal deliveries and admissions in NICU
Sagin-Dain L, <i>et al.</i> 2022 [27]	Systematic Review	Previously published evidence of unfavourable effects of FP might not be relevant to the common practice
Pinar S, <i>et al.</i> 2018 [28]	Cross-sectional Study	Fundal pressure does not have an adverse impact on maternal satisfaction or the health of the mother and infant
Oncu HN, <i>et al.</i> 2021 [29]	Prospective case-control Study	No increase in anal sphincter injury rates was found
Buhimschi, <i>et al.</i> 2002 [30]	Prospective Study	Women in the second stage of labour transiently increased their expulsive force by 86% of their baseline contraction using Valsalva manoeuvre and fundal pressure simultaneously
Bukovec P, <i>et al.</i> 2022 [31]	Retrospective Study	No correlation found between anal sphincter injury and fundal pressure
Sturzenegger K, <i>et al.</i> 2017 [32]	Retrospective Analysis	Caution must be applied in patients with certain risk factors
Suzuki S, <i>et al.</i> 2015 [33]	Retrospective Analysis	No evidence found that selective fundal pressure is unsafe for both mother and two babies during the second stage of the first twin delivery
Sartore A, <i>et al.</i> 2012 [37]	Retrospective Study	Urinary and anal incontinence, genital prolapse, and pelvic floor strength were not significantly different between the groups

lapse. The author advises not applying this FP and when applied, should be reported in patients' records [12].

Moiety concludes that FP is a manoeuvre that should be standardized and reported in a guideline. The author has found a shortening in the second stage of labour in nulliparous patients, this result seems linked, on the other hand, to severe perineal lacerations, given the mechanical resistance perineum can offer to the pushing. Operators should never forget that this manoeuvre can determine adverse effects on the maternal and foetal side, raising intrauterine pressure and leading to an increase in foetal head compression with subsequent cerebral hypoperfusion and brain oedema. Lower Apgar scores found in neonates born with FP seem to confirm this hypothesis. When applied, FP should be concomitant with uterine contractions, so the abdominal muscle tone can protect the uterus and other organs from external damage. In the shoulder dystocia scenario this manoeuvre should be avoided considering that it can worsen the condition. Post-partum incontinence and dyspareunia seem linked to FP [13].

Abedzadeh-Kalahroudi *et al.* reported that women under 35 years of age and with a high gestational age have a higher risk of perineal trauma when subjected to FP, reason why episiotomy should be avoided when indications are not strictly met [14].

Elise Farrington affirms that the use of uterine FP on women during vaginal birth in health facilities is widespread but also underestimated and no clear benefit has been demonstrated. The manoeuvre is often applied at the wrong time without the right indications, and it can cause cava compression with subsequent maternal hypotension. An effort to prevent its use when not needed should be done [15].

Hofmeyr affirms in his trial that he will investigate whether upright posture and/or a controlled method of applying gentle assisted FP can improve labour outcomes for women and their babies.

Steady but gentle pressure is applied in the long axis of the uterus during contractions for a maximum of 30 s, with at least 30s rest before the next application. If FP is found to have a measurable beneficial effect, this gentle approach can be promoted as a replacement for the uncontrolled methods currently in use [16].

In his randomized study indeed, the author affirms that there were no differences in secondary outcomes, except that maternal discomfort was greater for the GAP group, and for some women upright

position was uncomfortable. Anyway, he concluded that controlled FP should be used only in research environments and women should choose for delivery position they found most comfortable [7-16].

Koji Matsuo affirms that the uterine FP manoeuvre increases the risk of severe perineal laceration indeed the use of the manoeuvre must be cautioned, and careful attention must be paid to its application. The risk of employing the uterine FP manoeuvre is heightened in women who are giving birth for the first time, have longer a labour duration, and experience significant weight gain during pregnancy. First-time mothers who struggle with effective pushing during labour require coaching and incentives to reduce the likelihood of resorting to the uterine FP by shortening the second stage of labour. The subjects who underwent the uterine FP manoeuvre exhibited greater weight gain during pregnancy. Authors haven't found a specific hypothesis to explain these results, but one could speculate that the increased pressure or tension in the birth canal, caused by the additional body weight, might impede the descent of the foetus through the birth canal. The use of the uterine FP manoeuvre during vaginal delivery has been associated with various complications, including uterine rupture, anal sphincter tears, amniotic fluid embolism, and injuries to the neonatal central nervous system or brachial plexus. This author found that sphincter tears were associated with nulliparity, post maturity, FP, midline episiotomy, and foetal weight.

Although the number of cases is limited, the authors reported one instance of shoulder dystocia following the uterine FP manoeuvre. This case supports previous reports suggesting that the manoeuvre could exert non-physiological force on the pelvic floor and potentially damage the perineal sphincter. While it has been suggested that the uterine FP manoeuvre might reduce the need for operative interventions during the second stage of labour under specific circumstances, caution must be exercised, and careful attention should be given to its application [17].

Eijiro Hayata *et al.* made a retrospective study in 2017 focusing also on FP application in twin pregnancies.

Compared to single pregnancies, twin pregnancies are more prone to developing non-reassuring foetal status (NRFS), leading to a higher likelihood of opting for an expedited delivery. Given the increased chances of having low-birth-weight infants and

abnormal rotation, the use of vacuum extraction and forceps delivery may present challenges. Consequently, employing the uterine FP manoeuvre (UFP) for the delivery of the first twin can be considered an effective approach to expedite the process.

It has been reported that delivery with UFP can potentially result in a higher incidence of severe perineal lacerations, with a rate of 10.9%.

Furthermore, obstetricians need to consider the risk factors associated with uterine rupture due to UFP, which include grand multiparity, induction of labour in a previously scarred uterus, uterine malformations such as bicornuate uterus or septate uterus, and so on, inappropriate use of oxytocin or prostaglandins, utilization of vacuum extraction or forceps delivery, and excessive or overly forceful application of FP [18].

Wei SC et al. report a case of uterine rupture in two cases of hydropic fetuses with subsequent shoulder dystocia at the second stage after repeated FPs. The author affirms that the severe abdominal pain that escalates to an unbearable level during the Kristeller manoeuvre or fresh vaginal bleeding can be early signs of uterine rupture.

In the described scenario, an emergency laparotomy was carried out, unveiling a significant hematoma located in the left broad ligament. The hematoma exhibited multiple sites of bleeding, involving several branches uterine artery branches [19].

In a comprehensive analysis utilizing multivariate logistic regression on a dataset comprising 9,743 deliveries carried out by Romana Furrer *et al.* it was observed that among the 919 deliveries involving uterine FP, there were associations between UFP and shoulder dystocia in both spontaneous and assisted vaginal deliveries. Furthermore, the implementation of UFP was linked to adverse neonatal outcomes. However, it remains challenging to establish whether the intervention itself is the cause of the adverse outcomes or if the adverse outcomes are the result of an existing pathological condition that necessitated the intervention. One possible explanation for the increased occurrence of foetal acidosis following UFP could be a reduction in placental oxygenation due to the physical pressure exerted on the uterine fundus. The association between UFP and shoulder dystocia may be attributed to the effects of external pressure, leading to faster descent of the foetus through the birth canal, thereby altering the physiological process and dynamics of foetal rotation and descent through the

maternal pelvis. Women who underwent FP reported a significantly higher frequency of dyspareunia and perineal pain [20].

Rajiv Mahendru affirms that, if the primary purpose of utilizing uterine FP in common practice is to expedite the second stage of labour, this statement is contradicted by the findings of his study. Nonetheless, in cases of delayed progress in the second stage of labour, efforts should be made to identify the underlying causes and implement appropriate corrective measures. Considering the numerous complications associated with FP, both conventional and alternative healthcare providers should refrain from its application.

Uterine rupture, a rare yet severe complication in obstetric practice that poses risks to both the mother and foetus, occurs less frequently in unscarred uteruses, estimated to be around one in 8,000 to 15,000 deliveries. However, the incidence of uterine rupture increases when FP is exerted on the uterus during active labour. Even Gynaecological complications that could arise should be considered like utero-vaginal prolapse [21].

Pan HS shows a case report about a spontaneous uterine rupture in G3 P0 patient with the only risk factor being the uterine FP applied at delivery.

The occurrence of spontaneous rupture in an unscarred uterus during labour is infrequent, as an author have documented only one case at our facility over ten years. Risk factors that contribute to this condition involve the weakening of the uterine muscle and the utilization of FP. Detecting the rupture at an early stage and promptly undertaking surgical intervention are the primary approaches for managing this situation [22].

S J Gross affirms that FP, when applied in the absence of other manoeuvres, resulted in a 77% complication rate. The combination of FP and traction has been linked to complications affecting the neurological and orthopaedic domains. Considering the mechanism of FP, which exerts additional force on the anterior shoulder, pushing it against the pubic bone, it is not surprising to observe the heightened risk of brachial plexus injury and the need for increased traction to facilitate delivery [23].

Nicholas Rubashkin affirms that the normal birth policy has failed to achieve its objectives and also patients' ability to refuse the Kristeller manoeuvre is limited [24].

Loïc Sentilhes *et al.* affirm in their international guideline that the FP (grade C) is avoided especially in the shoulder dystocia scenario [25].

Positive opinions

Kanninen affirms that the second stage of labour is associated with a 20-minute decrease in the time of labour and a small decrease in artery PH in the neonatal umbilical artery. FP in the second stage of labour was associated also with a 0.03 decrease in umbilical artery pH, and a 3.5 non-significantly higher chance (4.9% vs 0.7%) of APGAR < 7 at 5 min, with no effect on maternal lacerations, neonatal trauma or admission to the neonatal intensive care unit, compared to no FP. This Author, in examining data between patients who received FP or not, hasn't found a difference in risk of having perineal or cervical laceration. FP was applied manually or with a belt device. However, none of the included RCTs of this systematic review were blinded, as the intervention is difficult to blind or to have a feasible sham intervention [26].

As said by Sagi-Dain L *et al.* standardized guidelines are needed to prevent incorrect FP application and assist the obstetricians in medical-legal cases. Application of FP in deliveries when is not strictly needed, as well as avoidance of this manoeuvre in cases that could benefit from manual pressure with the right timing and execution, avoiding operative delivery, might contribute to adverse effects, making it impossible to draw any solid conclusion [27]. Pinar affirms that FP is commonly applied without a specific indication, but rather in situations where the woman faced difficulties in bearing down effectively, encountered bradycardia in the infant, experienced prolonged second stage of labour, or encountered shoulder dystocia and when applied is more frequently associated with episiotomy, but at the same time, this technique does not have an adverse impact on maternal overall labour satisfaction and does not seem to have consequences on mother or baby health status.

In his study, FP was administered using various techniques such as the front arm, fist, elbow, and hands, typically for approximately 20 seconds, repeated 4 to 5 times. Some women who received FP reported experiencing pain during the procedure, while an almost equal number stated that it eased their labour and assisted in the birthing process. Similarly, there was no association observed between infant body weight and the use of FP.

These findings highlight the importance of obtaining informed consent from women before administering FP to ensure the protection of women's autonomy during the birthing process.

To reduce the frequency of FP application, healthcare professionals may be advised, particularly when dealing with fully dilated primiparous women, to exercise patience and allocate sufficient time for spontaneous bearing down, allowing the foetus to progress forward and the perineum to stretch. Additionally, pregnant women should not be kept in a supine position for extended periods based on the belief that an upright position aids the internal rotation of the infant and facilitates its movement [28]. Öncü shows that FP in the second stage of labour doesn't cause and increase in obstetric anal sphincter injury (OASI). It seems also that mediolateral episiotomy has a highly protective effect on the incidence of OASI during operative vaginal delivery. This data was found at 3D transperineal ultrasound. Numerous techniques have been explored to mitigate the risk of perineal tears during childbirth. These techniques encompass perineal massage, manual perineal support, warm compresses and delayed straining.

The utilization of 45° mediolateral episiotomy has also been shown to significantly decrease the occurrence of obstetric anal sphincter injury (OASI) during operative vaginal deliveries [29].

Catalin S Buhimschi using a sensor-tip intrauterine catheter has found that not in every woman FP causes an intrauterine pressure rise. Myometrium that is relatively thinner and more advanced gestational age is indicative of effective transmission. Nevertheless, it is also plausible that the rate of complications reflects a pre-existing abnormal labour and is not directly linked to the utilization of FP.

Monitor used in this study can help in practicing a controlled FP being the specialist always aware of the intrauterine conditions [30].

Petra Bukovec affirms that FP is not related to anal sphincter injury, and it can be used safely also in combination with instrumental delivery [31].

Karin Sturzenegger advice caution with the use of FP in patients with uterine rupture risk factors, such as age at the delivery > 40 years, multiparity, abnormal placentation and previous uterine surgery [32].

Shunji Suzuki affirm that there was no evidence that selective uterine FP is unsafe for both mother and two babies during the second stage of the first twin delivery. No association was found between UFP and neonatal complications. While the use of UFP did not demonstrate any apparent links to neonatal complications, it could potentially lead to maternal complications such as postpartum haemorrhage.

morrhage, severe perineal lacerations, and cervical lacerations.

This manoeuvre seems to be used more often in monochorionic twin pregnancies maybe because operators tend to be more cautious in these scenarios. Improper utilization of the manoeuvre during the delivery of the first twin may also result in elevated intrauterine pressure, intracranial pressure, and placental circulatory disruptions in the second twin, such as acute foeto-foetal haemorrhage. Nevertheless, in the present study, the selective implementation of UFPM appears to be not associated with neonatal complications [33].

Ching-Hsing Hsieh in his study explains the technique to apply a correct FP. The operator should apply pressure on the fundus longitudinally keeping an angle of 30° or 40° to the maternal spine but at the same time he explains that caution is recommended in the application of uterine FP.

Uterine FP involves manually exerting pressure on the uterine fundus using the practitioner's forearms, elbows, or palms, applying it at an angle of 30° to 45° relative to the maternal spine, directed towards the pelvis. The pressure is administered longitudinally, and it is recommended to apply gentle, firm, and consistent pressure. The application of uterine FP can lead to various adverse effects, including uterine rupture, postpartum urinary retention, severe perineal trauma and pain, rib fracture, postpartum dyspareunia, as well as the potential for neonatal distress or trauma, furthermore in some situations [34-36].

Andrea Sartore affirms that the Kristeller manoeuvre does not modify puerperal pelvic floor function when examined at three months after delivery but increases episiotomy rates to 76.9%. The impact on the maternal perineum remains uncertain based on our findings. There was no discernible difference observed between mothers who underwent the Kristeller manoeuvre and those who did not undergo the manoeuvre. Through a regression analysis model, the author determined that only the duration of the second stage, neonatal weight, and the use of episiotomies were significantly associated with the Kristeller manoeuvre. Furthermore, our study revealed that the group subjected to uterine FP exhibited a notably higher incidence of dyspareunia [37].

Uncertain opinion

Olus Api affirms that the application of FP on a delivering woman was ineffective in shortening the

second stage of labour. There was no difference in the second stage duration between the intervention and control groups. It must be remembered indeed that it presents a challenge to precisely determine the second stage effective start. The outcomes for newborns were favourable in both groups, with no instances of cord blood pH falling below 7.2. The mean values of HCO₃ and base excess were also within the expected ranges. As a result, in this study, the utilization of FP does not appear to negatively impact the immediate neonatal outcomes [38-39].

DISCUSSION

There is no standardized approach in managing the second stage of delivery [40, 42].

In cases of non-reassuring foetal status, failure to progress, maternal exhaustion, and conditions that preclude maternal Valsalva, there are several different approaches to shorten the second stage of labour. These include the use of traditional operative delivery methods such as the vacuum, forceps and, also controverse Fundal Pressure (FP) which still have a place nowadays in the delivery room. Fundal pressure (FP) is an ancient practice that has been studied in modern obstetrics for possible maternal and foetal complications. Invented by Samuel Kristeller in the late 19th century, it consists of an attempt to assist spontaneous vaginal delivery by applying pressure on the maternal abdomen.

In the cited studies it seems that having a real indication of this manoeuvre is fundamental for a successful and damage-free delivery being the FP related to some complications on the maternal and foetal side [43]. Between maternal complications most frightening is the uterine rupture often consequent to incorrect execution or wrong timing of the pressure applied. Between foetal complications shoulder dystocia is the most dangerous one but we must not forget that FP is related for some authors to worse neonatal blood pH values after birth. One explanation could be that the foetal head compression in foetuses without good reserves can cause a rise in intracranial pressure activating peripheral baroreceptors and increasing consequently foetal heart rate provoking after many responses of this type, acidaemia [41, 44, 45]. Given all those implications and the different opinions on the subject, one must not be surprised by the great number of legal litigations this manoeuvre causes.

CONCLUSIONS

Kristeller manoeuvre application is one of the most controversial topics in second-stage delivery management. Authors feel to say that if needed, the patient must be informed about what the operator is trying to achieve with this manoeuvre and when applied, it should be written in the clinical report. Specialists should be trained to apply uterine fundal pressure correctly at the right moment. Avoiding most dangerous complications that should be prevented. Another thing that can be done to shorten the second stage of delivery and to reduce damage is combining this manoeuvre with the use of traditional devices for vaginal operative delivery. Furthermore, it's the Author belief that this manoeuvre should be reported to international Guidelines to have strict indication for its application and reducing future legal litigations, due to the reason that although fundal pressure is still used in some settings, given its safety is yet unproven, WHO and FIGO do not recommend its use. Further studies are needed to assess more clearly in the population the real maternal and foetal complication rate.

COMPLIANCE WITH ETHICAL STANDARDS

Authors' contribution

G.R.D., A.M.: Conceptualization, project administration, writing – original draft. D.D.G.: Writing – review & editing. A.V.: Supervision. G.L.: Investigation, methodology. A.T., M.B., M.G., E.D.N.: Validation, visualization. M.D.: Resources, software.

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The authors declare that they have no conflict of interests.

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N/A.

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