

Possible feto-maternal clinical risk of the Kristeller's expression

Research Article

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Abstract: The aim of this clinical case study is evaluation of possible intrapartum complication of the uncritical Kristeller's expression. In this retrospective clinical study, data on seven parturients with significant maternal or fetal intrapartum complications during the second labor stage and Kristeller expression, associated with the maneuver, were analyzed. Data was obtained from patient files: history of delivery room protocol and neonatal reports from two tertiary maternal wards. There were five uterine ruptures that were treated by laparotomy and uterine sutures. Atypical rupture location on the uterine fundus occurred in one case, isthmus rupture in three cases, and rupture of the scar left after a previous cesarean section as a potential risk factor for uterine rupture in one case. Complex uterine cervicoisthmic rupture with incomplete colporrhexis occurred during the delivery of a macrosomic child at an outpatient ward. In one case, unilateral fracture of the tenth and eleventh ribs resolved spontaneously without complications. One case of peripartum trauma, possibly associated with extensive expression was observed in one neonates: cutaneous and subcutaneous hematoma on the back with traumatic unilateral adrenal hemorrhage. Both newborns were monitored, successfully treated, and discharged from the hospital free from complications. In conclusion, in the obstetrics as a high risk profession, a very critical approach should be exercised on choosing this maneuver, which should be reserved for the rare and strictly indicated cases, thereby strictly following the professional rules to avoid generally unnecessary and unpleasant litigation and forensic expertise.

Keywords: Kristeller's expression • Labour • Forensic • Obstetrics • Risk

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1. Introduction

Samuel Kristeller, a Berlin obstetrician, has described transabdominal fetal expression as "an aid in weak uterine contractions" at the time of expulsion (second stage of delivery): "... the fundus of the uterus is held by the hands and pushed in case of weak uterine contraction; the expression should take 5-8 seconds, synchronously with the uterine contraction, with a pause of 0,5 -3 minutes" [1-3]. In some deliveries, a critical, non-extensive and timely Kristeller maneuver (in anglosaxonic literature: *fundal pressure*) provides a breakthrough at the end of the second labor stage facilitating the child expulsion. However, untimely, uncritical and extensive fetal expression may entail

severe intrapartum complications for both the mother and the child.

The aim of this clinical case study is evaluation of possible intrapartum maternal and fetal complications of the uncritical Kristeller's expression.

2. Material and Methods

In this retrospective clinical study, data on seven case report parturients with significant maternal or fetal intrapartum complications during the second labor stage and Kristeller expression, which were associated with the maneuver, were analyzed. Data were obtained from patient files: history of delivery and delivery room protocol, and neonatal reports from two tertiary university

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Table 1. Intrapartal maternal and fetal complications during the Kristeller's expression.

No.	Age	Parity	Maternal complications	Fetal complications	Outcome
1.	24	I	Isthmic uterine rupture		Laparotomia Suture
2.	28	I	Fractura costarum X-XI		Spontaneous recovered
3.	29	II	Vaginal birth after caesarean section. Uterine rupture with intraabdominal fetal expulsion		Laparotomia Suture
4.	31	III	Fundal uterine rupture		Laparotomia Suture
5.	22	I	Isthmic uterine rupture		Laparotomia Suture
6.	24	I	Cervicoisthmic uterine rupture with incomplete colpaporrhexis and cervicovaginal lacerations		Laparotomia Revision and suture
7.	26	I		Skin and subcutaneous dorsal haemathoma. Traumatic unilateral adrenal haemorrhage Fetal macrosomia	Spontaneous recovered

perinatal wards in period 2000-2005 years (2000 birth per year/ per ward). In our series, there was no case of breech delivery or operative completion of vaginal delivery by vacuum or forceps extraction. Kristeller expression was used in rare deliveries with secondarily weak labor pains.

Cervical, vaginal and perineal lacerations, uterine atony and shoulder dystocia, which may, along with other risk factors, cause uncritical and premature expression could not be attributed exclusively to the expression procedure.

Because small number of rare clinical cases verified in these departments, statistical evaluation of Kristeller's expression complications is not possible.

3. Results

Table 1 shows data on seven women aged 22-31, five of them primigravidae, and one secundigravida and tertigravida, each with uncomplicated course of pregnancy, without comorbidity. There were five uterine ruptures that were treated by laparotomy and uterine sutures. Atypical rupture location on the uterine fundus occurred in one case, isthmus rupture in three cases, and rupture of the scar left after a previous cesarean section as a potential risk factor for uterine rupture in one case. Complex uterine cervicoisthmic rupture with incomplete colporrhexis occurred during the delivery of a macrosomic child at an outpatient ward. Upon delivery, the patient developed severe hemorrhagic shock and was transferred with resuscitation to a clinical hospital for operative procedure. In one case, unilateral fracture of the tenth and eleventh ribs resolved spontaneously without complications. One peripartum trauma possibly associated with extensive Kristeller's expression were observed in one neonate: cutaneous and subcutaneous hematoma on the back with traumatic unilateral adrenal

hemorrhage. Both newborns were monitored, followed by spontaneous recovery, and were discharged from the hospital free from complications. All complications were readily recognized, and the patients were administered proper resuscitation and operative treatment without any sequels.

It should be noted that a higher rate of most complications was associated with three obstetricians.

4. Discussion

In recent obstetrics, indications, risks, incidence and the correct technique of Kristeller's expression are often discussed by midwives and obstetricians [3,4]. The fact is that the use of Kristeller maneuver has been almost completely abandoned in most countries where normal labor is guided exclusively by midwives. In these countries, parturient women may choose labor position, thus reducing the incidence of episiotomy and operative vaginal delivery [6-8].

Some obstetricians tend to perform premature and too extensive Kristeller expression either due to their "obstetric habits" or inadequate experience in operative vaginal delivery, vacuum extraction or forceps extraction. David [3] suggests a list of indications when Kristeller expression, critical fundal pressure, may be used. These include assistance on delivery by vacuum or forceps extraction, acute fetal hypoxia with pathologic CTG recording and head at pelvic outlet, assistance toward the end of the second labor stage in peridural analgesia, and assistance on head engagement during vaginal breech delivery according to Bracht. Contraindications are also listed, e.g., shoulder dystocia, fundal placenta, vaginal delivery after cesarean section, and inadequate dilatation of uterine cervix with pelvic non-engagement of the head (Table 2).

Table 2. Indication and contraindications for the Kristeller's fetal expression (modif. 3).

INDICATIONS	CONTRAINDICATIONS
<ul style="list-style-type: none"> · assistance on delivery by vacuum or forceps extraction · assistance on delivery during caesarean section · acute fetal hypoxia with pathologic CTG recording and head at pelvic outlet · assistance toward the end of the second labor stage in peridural analgesia · secondary uterine inertia · assistance on head engagement during vaginal breech delivery according to Bracht 	<ul style="list-style-type: none"> · shoulder dystocia · fundal placenta · vaginal delivery after cesarean section and uterine scarr · inadequate dilatation of uterine cervix with pelvic non-engagement of the head

From the expert forensic standpoint, it is not justified to use Kristeller maneuver to reduce second labor stage duration, especially if the fetal head is above the interspinal line, or as a substitute for operative termination of the delivery. Experimental study by Buhimschi et al. [9] demonstrated the intrauterine pressure increase with fundal pressure during the second labor stage, although not in all cases.

The potential intrapartum complications of uncritical (premature), forced or too extensive Kristeller expression can include contusion of the uterus and peritoneum, premature (intrapartum) abruptio placentae, rupture of (non)cicatricial uterus, lesions of abdominal organs (rupture of the liver, omentum, stomach), and in the child fracture of the femur and other bones, asphyxia, peripartal death, intracranial and subgaleal haemorrhage, umbilical compression, alteration in the intervillous circulation with possible fetomaternal micro (macro) transfusion and possible (transient) trophoblastic or amniotic microembolism, and child visceral lesions. Rib and sternum fractures, higher incidence of third- and fourth degree perineal lacerations and hematomas of the anterior abdominal wall have also been reported [3,4,10-12]. Untimely Kristeller expression is a major risk factor for the occurrence of fetal shoulder dystocia, where it is a professional error associated with a high rate of complications (77%) such as anterior shoulder impaction to the symphysis, uterine rupture, severe fetal orthopedic and neurologic sequels, and even neonatal lethal outcome [13]. The maneuver is only allowed upon shoulder dysincarceration to assist the fetal trunk expulsion by some of additional maneuvers, e.g., McRoberts, Woods, Resnik or Barnum maneuver [11,13]. The majority of Central European and Anglo-Saxon obstetric textbooks and handbooks do not describe Kristeller maneuver. It has been prohibited or discouraged in Amsterdam, Dublin, at maternal wards in Austria, Germany, France, Great Britain, Switzerland and Slovenia. According to a multicenter European perinatologic study from 2002, the maneuver is allowed to perform in Perugia and Athens [5,14] whereas an

American study reports on the use of fundal pressure during the second labor stage by as many as 84% of the midwives [15].

In addition to demonstrated advantages of delivery in longitudinal positions such as sitting or squatting, it reduces the opportunities to use this maneuver. The semi-sitting position is more acceptable for both the parturient and the staff, reduces the second labor stage, oxytocin requirement and rate of episiotomy [6,16-19]. Uncritical and extensive expression of the fetus may definitely have unfavorable impact on the woman's psychic and emotional state with potential short- and long-term sequels [20].

If the obstetrician decides to use Kristeller expression, it should be performed strictly in line with professional rules, at the end of the second labor stage, with light pressure upon uterine fundus synchronously with labor pains, and without any vigorous modification. In this cases reports, six maternal and two severe intrapartum fetal complications associated with Kristeller expression have been presented. Kristeller's expression was used for rare obstetrician for "secondarily weak labor pains" in these deliveries. All cases were submitted to expert clinical evaluation and none underwent forensic procedure. These intrapartum complications of Kristeller expression were clinically verified as procedure related complications rather than surgeon's error (vaginal delivery after cesarean section).

In obstetrics as a high risk profession, a very critical approach should be exercised on choosing this maneuver, which should be reserved for the rare and strictly indicated cases, thereby strictly following the professional rules to avoid generally unnecessary and unpleasant litigation and forensic expertise.

In line with the principles of modern obstetrics, Kristeller maneuver should be reserved for the specific rare cases to ease the second labor stage by gently pressing the uterine fundus synchronously with labor pains in case of large child or for secondary inertia uteri with cephalic presentation at pelvic outlet in maternal supine position. Delivery in the semi-sitting/sitting

position, associated with better labor pain coordination and fetal head engagement in the birth canal, thus reducing the incidence of secondary inertia uteri, should be available to all women. The use of Kristeller expression, that may potentially be associated with severe intrapartum complications, can be avoided in the majority of cases. It is consistent with our own opinion

on the issue based on our long-standing experience. Future clinical studies should assess the potential risk and benefit of the procedure in terms of forensic medicine and evidence based medicine.

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