УДК 618.5-089.888
https://doi.org/10.17816/JOWD69233-42

OPERATIVE VAGINAL DELIVERY: OUTCOMES FOR MOTHERS AND NEWBORNS

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For citation: Leonova MD, Aganezova NV, Aganezov SS. Operative vaginal delivery: outcomes for mothers and newborns. *Journal of Obstetrics and Women's Diseases.* 2020;69(2):33-42. https://doi.org/10.17816/JOWD69233-42

Received: February 6, 2020 Revised: March 3, 2020 Accepted: April 13, 2020

▪ ***Hypothesis/aims of study.*** The frequency of surgical abdominal delivery in Russia, as in the world, continues to grow, reaching 29.3% in 2017. Operative vaginal delivery is an alternative to abdominal delivery in the second stage of labor. This study was aimed at analyzing the outcome of labor for mothers and newborns using different operative vaginal delivery methods.

Study design, materials and methods. We studied 293 cases of childbirth in the period from 2015 to 2018. Three groups were distinguished: (I) the main group consisting of 172 women delivered by the operation of applying obstetric forceps (OF); (II) the comparison group including 85 patients delivered by the operation of vacuum extraction (VE) with the fetal head being near the pelvic floor; and (III) the control group comprising 34 cases of vaginal birth without use of instrumental delivery. In group I, 114 patients were delivered by the low forceps operation (subgroup IA), and 60 individuals by the mid forceps operation (subgroup IB).

Results. Vaginal lacerations were found in 21.3% of cases in group I, less often less often in groups II (10.6%, $p < 0.05$) and III (2.9%, $p < 0.05$). Vaginal hematoma occurred in one patient of group III (2.9%) and three women of group I (1.7%, $p > 0.05$). There were no cases of damage to the anal sphincter. The greatest blood loss was recorded in subgroup IB (554 ± 44.9 ml), when compared to subgroup IA (473 ± 20.7 ml; $p < 0.05$), group II (418 ± 24.9 ml; $p < 0.05$), and group III (347 ± 33.4 ml; $p < 0.05$). There were no differences in blood loss between the outlet OF and VE groups ($p > 0.05$). Most newborns were born in good condition (84.5%, 77.6%, and 88.2% of cases in groups I, II, and III, respectively). Cephalohematoma in newborns was more common after VE (32.9%) than after OF (9.2%, $p < 0.01$) and in control (5.9%, $p < 0.01$). No retinal hemorrhage was recorded in newborns. There were no significant differences in the frequency of children being transferred to the children's hospital (7.5%, 9.4%, and 8.8% of cases in groups I, II, and III, respectively; $p > 0.05$).

Conclusion. The use of OF is an effective and safe method of vaginal operative delivery. It does not increase the fetal injury rate, the frequency of newborn cephalohematoma being 3.5 times less than with VE. Complications of OF and VE (except for a greater number of vaginal lacerations in cases of OF), blood loss, and the course and duration of the postpartum stay in the maternity ward are comparable.

▪ **Keywords:** operative vaginal delivery; obstetric forceps; fetal vacuum extraction.

ОПЕРАТИВНОЕ ВЛАГАЛИЩНОЕ РОДОРАЗРЕШЕНИЕ: ИСХОДЫ ДЛЯ МАТЕРЕЙ И НОВОРОЖДЕННЫХ

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Для цитирования: Леонова М.Д., Аганезова Н.В., Аганезов С.С., и др. Оперативное влагалищное родоразрешение: исходы для матерей и новорожденных // Журнал акушерства и женских болезней. – 2020. – Т. 69. – № 2. – С. 33–42. https://doi.org/10.17816/JOWD69233-42

Поступила: 06.02.2020 Одобрена: 03.03.2020 Принята: 13.04.2020

▪ ***Введение.*** Частота оперативного абдоминального родоразрешения в России, как и в мире, продолжает расти. В 2017 г. в РФ она достигла 29,3 %. Во втором периоде родов альтернативой абдоминальному является оперативное влагалищное родоразрешение.

Цель — проанализировать исходы родов для матерей и новорожденных при разных видах оперативного влагалищного родоразрешения.

Материалы и методы. Изучено 293 случая родов в период 2015–2018 гг. Выделено три группы: основная группа (I) — 172 женщины, родоразрешенные операцией наложения акушерских щипцов; группа сравнения (II) — 85 пациенток, родоразрешенных операцией вакуум-экстракции при расположении головки плода в плоскости выхода малого таза; группа контроля (III) — 34 случая влагалищных родов без применения инструментальных родоразрешающих операций. В I группе 114 пациенткам применены выходные акушерские щипцы (подгруппа IA), 60 женщинам — полостные акушерские щипцы (подгруппа IБ).

Результаты исследования. Разрывы слизистой влагалища встречались в 21,3 % случаев в I группе, реже — в группах сравнения (10,6 %, $p < 0,05$) и контроля (2,9 %, $p < 0,05$). Гематома влагалища возникла у одной пациентки группы контроля (2,9 %) и трех женщин основной группы (1,7 %, $p > 0,05$). Случаев повреждения анального сфинктера не было. Наибольшая кровопотеря была в подгруппе IБ (554 ± 44,87 мл, $p < 0,05$) по сравнению с подгруппой IA (473 ± 20,7 мл), группами II (418 ± 24,86 мл) и III (347 ± 33,43 мл). Между группами выходных акушерских щипцов и вакуум-экстракции плода различий в кровопотери не было ($p > 0,05$). Большинство детей родились в удовлетворительном состоянии (84,5; 77,6; 88,2 % в I, во II и в III группах соответственно). Кефалогематома у новорожденных чаще встречалась после вакуум-экстракции плода (32,9 %), чем после применения акушерских щипцов (9,2 %, $p < 0,01$) и в группе контроля (5,9 %, $p < 0,01$). Кровоизлияний в сетчатку глаза у новорожденных не было. Достоверных различий в частоте перевода детей в детскую больницу не выявлено (7,5; 9,4; 8,8 % в I, во II и в III группах соответственно ($p > 0,05$)).

Выводы. Применение акушерских щипцов является эффективным, безопасным методом влагалищного оперативного родоразрешения, не увеличивает травматизм плода, частота кефалогематомы новорожденных при использовании этого метода в 3,5 раза меньше, чем при вакуум-экстракции плода. Осложнения после применения акушерских щипцов и вакуум-экстракции плода (кроме большего числа разрывов слизистой влагалища в случаях акушерских щипцов), кровопотеря, течение и длительность послеродового пребывания в родильном доме сравнимы.

▪ **Ключевые слова:** оперативное влагалищное родоразрешение; акушерские щипцы; вакуум-экстракция плода.

Introduction

The frequency of operative abdominal delivery throughout the world continues to grow, so its tendency is consistent with the epidemic. The rate of abdominal delivery worldwide is 21% and ranges from 5% in South Africa to 60% in South America [1]. In the Russian Federation, the frequency of cesarean section surgery reached 29.3% in 2017 [2]. For an objective assessment of indications for surgery and optimization of the structure of abdominal delivery, Robson's classification was developed [3]. It has been established that with an increase in the frequency of cesarean section surgery by over 9%–16%, maternal and perinatal morbidity and mortality do not decrease [4]. It is possible to reduce the number of cesarean section surgeries and thereby decrease the level of postoperative complications for puerperae and adverse outcomes for newborns through a thorough analysis and a differentiated approach to a planned abdominal delivery.

An alternative to cesarean section surgery in the second stage of labor is surgical vaginal delivery. Sudden complications from the part of the woman in labor and the fetus during the act of delivery are often impossible to predict. Acute fetal hypoxia, prolonged presence of the head in the birth canal, and decompensation of the somatic pathology of the mother in the second stage of labor with the fetal head not higher than a wide part of the pelvic cavity are the points of application when the value of the surgical vaginal birth is indisputable. In the 1970–1990s, obstetric forceps (OF) were widely used when the fetal head was located above a wide part of the pelvic cavity, which gave rise to the opinion that this variant of surgical vaginal delivery was traumatic. In the same period, a progressive increase in abdominal delivery started. However, fetal extraction during cesarean section surgery in the second stage of labor is not only associated with the risk of intraoperative and infectious complications and greater blood loss in the postpartum period in women but can also be traumatic for the fetus [5].

Currently, there remains a debatable question about the benefits and risks of various instrumental

interventions in the second stage of labor [the use of OF and vacuum-assisted delivery (VAS)]. Several obstetrician-gynecologists have a "professional barrier" in relation to OF.

This work aimed to analyze the outcomes of labor for mothers and newborns with different types of surgical vaginal delivery.

Materials and methods

From 2015 to 2018, a prospective case-control study was conducted, which included 293 women who had delivery at St. Petersburg Maternity Hospital No. 13 (clinical base of the Department of Obstetrics and Gynecology, Mechnikov North Western State Medical University). The patients were divided into three groups: the main group (I) included 72 women who had delivery by OF surgery, the comparison group (II) with 85 patients who had delivery by VAS surgery, and the control group (III) with 34 patients who delivered via the natural birth canal without the use of instrumental delivery surgeries. In group I, outlet OF were used for 114 patients (subgroup IA), and OF were applied in 60 women when the fetal head was in the pelvic cavity (subgroup IB). In group II, all VAS surgeries were performed with the fetal head in the area of pelvic outlet.

Inclusion criteria were age of 18–45 years, singleton pregnancy, between 34 and 41 (6/7) weeks' gestational age at birth, vertex presentation of the fetal head, absence of contraindications for childbirth through the natural birth canal, and signed informed consent to participate in the study. Additional criteria for inclusion in the main and comparison groups included the presence of indications and signed informed consent for surgical delivery. Exclusion criteria were abnormalities of the pelvic inlet and placenta and signs of acute bacterial-viral diseases of the urogenital tract during childbirth.

The conditions for operative vaginal delivery included full dilatation of the mouth of womb, absence of the fetal bladder, live fetus, adequate analgesia (for OF), cephalic presentation, lack of signs of mismatch between the size of the fetal head and pelvis of the mother, fetal head presentation no higher than a wide part of the pelvis cavity, and empty urinary bladder. The indicated conditions for vaginal operative delivery correspond to the current clinical protocol "Clinical recommendations (protocol). The provision of specialized medical care for surgical vaginal delivery in the presence of a live fetus (using obstetric forceps or using a vacuum extractor or delivery using another obstetric aid)" (Moscow, 2017) [6].

The rules for preparing for surgeries corresponded to the above clinical protocol, as well as to Russian and international guidelines [6–8]. The beginning of the OF surgery was preceded by examining externally and vaginally, which determined compliance with all conditions for this type of delivery, and emptying the urinary bladder. During the vaginal examination, the presentation of the fetal head and its relation to the bony landmarks of the true pelvis were determined. The height of the fetal head was evaluated following the classical planes of the true pelvis. Surgery of the application of outlet OF was performed when the lower pole of the fetal head was located in the area of pelvic outlet and when the interparietal suture was in its direct size. Surgery of applying cavity OF was performed when the fetal head was located in a narrow part of the pelvic cavity and the interparietal suture was in one of the oblique sizes. The technique of the OF application surgery corresponded to the current clinical protocol [6]. In all cases of the use of OF, a mediolateral episiotomy was performed for various indications. All delivery surgeries by applying OF were performed using the Simpson–Fenomenov's forceps.

VAS was performed after examining the vagina and emptying of the urinary bladder using a stationary vacuum extractor with silicone cups Medela. The surgical technique corresponded to the current clinical protocol [6]. All VAS surgeries were performed with the location of the fetal head lower pole on the pelvic diaphragm.

Statistical data processing was performed using a personal computer, Microsoft Excel 2013 software, and Statistica 10.0 software. For a comparative analysis of indicators with a normal distribution, the Student *t*-test was used. The level of statistical significance was taken at $p < 0.05$.

Study results

The average age of patients in control group III (31.82 ± 0.84 years) was significantly greater than in main group I (29.76 ± 0.41 years; $p = 0.03$) and comparison group II (29.37 ± 0.51 years; $p = 0.02$). There were no significant differences

in this indicator in women of groups I and II ($p > 0.05$). Body mass index differed significantly in women of the groups of OF (28.05 ± 0.37) and VAS (26.42 ± 0.46; $p = 0.007$). Compared with the control group (27.55 ± 0.59), there were no statistically significant differences ($p > 0.05$).

Most of the women were primigravida in the groups where surgical vaginal delivery was performed and multipara in the control group. The distribution of women examined by parity is presented in Table 1.

There were no differences in the gestational age during delivery, as it was 39.91 ± 0.09 weeks in the main group, 39.87 ± 0.13 weeks in the comparison group, and 40.14 ± 0.14 weeks in the control group ($p > 0.05$).

In the range of extragenital diseases in women included in the study, cardiovascular diseases prevailed in all groups, which was due to the specialization of obstetric institution. Table 2 presents the structure of extragenital pathology in women of various groups.

In patients with preeclampsia with indications for surgical vaginal delivery, OF was more often used than VAS ($n = 27$; 15.5% and $n = 6$; 7.1%, respectively; $p < 0.05$).

There was no connection between a decrease in the amniotic fluid amount (amniotic index, determined antenatally by ultrasound at full-term gestation, of less than 5 cm) and delivery method, and there were 11 (6.3%) cases in the OF group, 5 (95%) in the VAS group, and 2 (5.9%) in the control group (for all comparisons, $p > 0.05$).

Indications for applying OF were acute fetal hypoxia ($n = 170$; 97.7%), high-degree myopia ($n = 1$; 0.57%), high hypertension uncontrolled with drugs ($n = 2$; 1.16%), and convulsive seizure in the second stage of labor in a patient with epilepsy that required medical sedation ($n = 1$; 0.57%). In 100% of cases, acute fetal hypoxia was the indication for VAS.

The use of oxytocin in childbirth did not affect the frequency of surgical vaginal delivery. Thus, 24 (13.8%) patients in the OF group, 7 (8.2%) in the VAS group, and 3 (8.8%) in the control group received oxytocin-induced labor induction. Oxytocin-induced labor stimulation was performed in 47 (27%) patients in the main group, 19 (22.4%) in the comparison group, and 7 (20.6%) in the control group [when comparing all indicators, there were no significant differences ($p > 0.05$)].

The vaginal mucosa ruptured in 37 (21.3%) women in the main group, 9 (10.6%) in the comparison group, and 1 (2.9%) in the control group ($p_{I–II} < 0.05$; $p_{I–III} < 0.05$; $p_{II–III} > 0.05$). Hysterocervicorrhesis was more common in the VAS group (11; 12.9%) than in the OF (12; 6.9%) and control groups (3; 8.8%), but the differences were not significant ($p > 0.05$). Vaginal hematoma occurred in one (2.9%) and three (1.7%) patients in the control and OF groups, ($p > 0.05$), respectively. During the follow-up period, there were no traumas to the anal sphincter.

The volume of blood loss determined by the gravimetric method (by weighing all napkins and diapers) is presented in the figure.

Table 1 / Таблица 1

Reproductive history of the examined patients
Репродуктивный анамнез обследованных женщин

Parity	Group			Significance of differences, $p < 0.05$
	Primary, obstetric forceps ($n = 174$) n, %	Comparison, vacuum-assisted delivery ($n = 85$) n, %	Control, natural vaginal delivery ($n = 34$) n, %	
	I	II	III	
Primigravida	95 (54.6%)	54 (65.3%)	12 (35.3%)	$p_{I–III} < 0.05$ $p_{II–III} < 0.01$
Multigravida primipara	45 (25.9%)	12 (14.1%)	5 (14.7%)	$p_{I–II} < 0.05$
Multipara	34 (19.5%)	19 (22.4%)	17 (50%)	$p_{I–III} < 0.01$ $p_{II–III} < 0.01$

ISSN 1684-0461 (Print)
ISSN 1683-9366 (Online)

Table 2 / Таблица 2

Extragenital pathology in pregnant women
Экстрагенитальная патология беременных

Somatic pathology	Groups		
	Primary, obstetric forceps (*n* = 174) *n*, %	Comparison, vacuum-assisted delivery (*n* = 85) *n*, %	Control, natural vaginal delivery (*n* = 34) *n*, %
	I	II	III
Cardiovascular system diseases (hypertensive disease, arterial hypertension, compensated cardiac failures, and heart rhythm disorders)	118 (68%)	54 (63.5%)	20 (59%)
Urinary system diseases (chronic pyelonephritis, urolithiasis, and chronic glomerulonephritis)	31 (17.8%)	13 (15%)	5 (14.7%)
Respiratory system diseases (chronic bronchitis, bronchial asthma, and chronic obstructive pulmonary disease)	8 (4.6%)	3 (3.5%)	1 (3%)
Endocrine system diseases (subclinical hypothyroidism and autoimmune thyroiditis)	7 (4%)	4 (4.7%)	2 (5.9%)

N o t e: $p > 0.05$ for all indicators.

Blood transfusion was performed in 1 (1.18%) patient from the VAS group and in 4 (2.3%) postpartum women after OF surgery ($p > 0.05$).

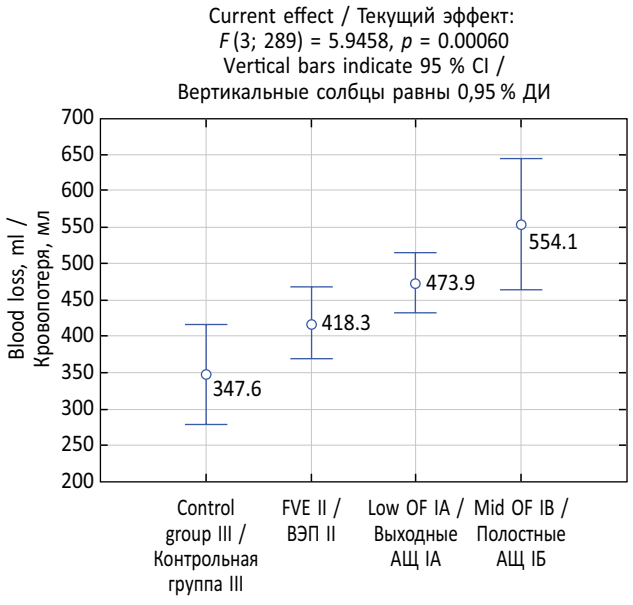
Manual entry into the uterine cavity due to hypotonic uterine hemorrhage in the early postpartum period or residual parts of the retained products was performed to 21 (12.1%) women of the main group, 8 (9.4%) in the comparison group, and 4 (11.8%) in the control group (for all comparisons, $p > 0.05$).

There were no complications of the postpartum period in puerperae in the groups under study.

The average rate of bed days after childbirth in the control group was 4.41 ± 0.15, which was significantly less ($p < 0.05$) than in the case of OF surgery (5.26 ± 0.09) or VAS (5.31 ± 0.13).

The weight of newborns in the groups did not differ significantly. It was 3577.36 ± 156.83 g in group I, 3438.7 ± 47 g in group II, and 3724.56 ± 88.12 g in group III. (Differences between all groups are significant at $p > 0.05$.)

The condition of the majority of newborns was rated as satisfactory, and this indicator did not differ significantly between the groups [147 (84.5%) children in the main group, 66 (77.6%)



Volume of blood loss in the studied groups: OF, obstetric forceps; FVE, fetal vacuum extraction

Объем кровопотери у женщин исследуемых групп: АЩ — акушерские щипцы; ВЭП — вакуум-экстракция плода

Table 3 / Таблица 3

Apgar score
Оценка новорожденных по шкале Апгар

Apgar score	Groups			Significance of differences (*p*)
	Comparison, vacuum-assisted delivery (*n* = 174) *n*, %	Primary, obstetric forceps (*n* = 85) *n*, % *M* ± *m*	Control, natural vaginal delivery (*n* = 34) *n*, % *M* ± *m*	
	I	II	III	
Minute 1	7.25 ± 0.06	7.1 ± 0.08	7.73 ± 0.11	$p_{I–II} > 0.05$ $p_{I–III} < 0.05$ $p_{II–III} < 0.05$
Minute 5	8.2 ± 0.04	8.32 ± 0.06	8.68 ± 0.1	$p_{I–II} > 0.05$ $p_{I–III} < 0.05$ $p_{II–III} < 0.05$

Table 4 / Таблица 4

Neonatal trauma
Травматизм новорожденных

Trauma	Groups			Significance of differences, *p* < 0,05
	Primary, obstetric forceps (*n* = 174) *n*, %	Comparison, vacuum-assisted delivery (*n* = 85) *n*, %	Control, natural vaginal delivery (*n* = 34) *n*, %	
	I	II	III	
Cephalohematoma	16 (9.2%)	28 (32.9%)	2 (5.9%)	$p_{I–II} < 0.01$ $p_{I–III} > 0.05$ $p_{II–III} < 0.01$
Skull fractures	2 (1.1%)	2 (2.4%)	0	$p_{I–II} > 0.05$

in the comparison group, and 30 (88.24%) in the control group; $p > 0.05$].

When analyzing newborn injuries, we obtained the following results, as presented in Table 4.

The transfer of newborns to the children's city hospital because of skull bone fractures was required in two cases: one (1.18%) after VAS and the other after surgery of applying cavity OF (0.6%). There were no differences between the constitutional features of mothers (height, and external pelvic dimensions) and the weight of injured newborns.

Retinal hemorrhages were not registered in newborns.

Artificial lung ventilation was performed in 4 (11.8%) newborns from mothers of the control group, 7 (4%) in the OF group, and 3 (5%) in the VAS group ($p > 0.05$ when comparing all groups).

When analyzing the frequency of transfer of newborns to the children's city hospital, there were no significant differences, with 3 (8.8%) newborns in the control group, 8 (9.4%) in the VAS group, and 13 (7.5%) in the OF group ($p > 0.05$).

Discussion

The likelihood of operative vaginal delivery was significantly higher in primiparous women.

Certain variants of extragenital pathology in puerperae can be an indication for vaginal operative delivery (if it is necessary to exclude labors of childbirth and/or to shorten the second stage of labor), including in a planned manner. In our study, there were no significant differences in the structure of extragenital pathology, and this characteristic was insignificant for the delivery termination option.

When choosing the methods of operative vaginal delivery, several factors are taken into account, namely, the frequency of obstetric injuries for the mother and fetus and its consequences, especially the course of the postpartum period, and the relevant skill mastery by the doctor.

Injuries of the soft birth canal tissues are traditionally associated more often with the use of OF [9]. In our study, there were no significant differences with hysterocervicorrhesis, vaginal hematomas with different variants of operative vaginal delivery, and independent natural vaginal delivery. Significant differences were identified only with ruptures of the vaginal mucosa, which were sutured and did not affect the course of the postpartum period.

It should be noted that there were no injuries of the anal sphincter in cases of surgical vaginal delivery. We believe that the routine execution of a mediolateral episiotomy during an OF surgery (optional in 100% of cases according to the clinical protocol of the Russian Federation) can minimize this variant of serious obstetric trauma for the mother. Our approach coincides with the study of de Leeuw et al. [10], which reported a significantly reduced the likelihood of damage to the anal sphincter during mediolateral episiotomy in each case of OF. The objectives of our study excluded studying the distant characteristics of the anatomical and functional full value condition of the pelvic diaphragm in operative vaginal delivery groups of women. At the same time, the literature provides data on the absence of relation between OF surgery use and serious consequences for the muscles of the pelvic diaphragm [11].

In general, OF use is associated with significantly greater blood loss than VAS use or labor management without the use of delivery instruments. The greatest blood loss volume was registered during surgery of applying the cavity OF. As mentioned above, all VAS surgeries described in the study were performed using the fetal head located in the area of the pelvic outlet. There were no significant differences between the amount of blood loss when applying the outlet OF and VAS (in all these cases, the fetal head was on the pelvic diaphragm). Perhaps a greater amount of blood loss during surgery of applying cavity OF is associated not with the instrument itself but with a higher position of the fetal head in the true pelvis. This assumption needs to be analyzed and studied.

Any method of operative vaginal delivery lengthens the period of patient stay in the hospital (without differences in the number of bed days depending on the type of intervention) in comparison with postpartum women after natural vaginal delivery.

In the vast majority of cases in our study, surgical vaginal delivery was performed for acute fetal hypoxia in the second stage of labor. In this regard, the safety and efficacy of instrumental methods used to conclude natural vaginal childbirth are extremely important. In all cases, surgical vaginal interventions were performed on time, as evidenced by a normal Apgar score in the main and comparison groups 5 min after delivery. There were no significant differences in the need for artificial mechanical pulmonary ventilation in newborns in the groups. The lack of relation between the need to transfer a newborn to a multidisciplinary children's hospital and the method of delivery is of particular interest. The data obtained dispel the myth that OF can aggravate the condition of the newborn and indicate the safety of this option for surgical vaginal delivery.

There were no differences in the frequency of skull fractures in newborns in the use of OF and a vacuum extractor, as these lesions were diagnosed equally often after application of various vaginal instrumental techniques. At the same time, cephalohematoma was significantly more common with the use of VAS [3.5 times more often ($p < 0.05$)] than OF (including cavity ones). Our results are consistent with the study of Johanson [9].

Particular attention must be paid to the technique of using OF and VAS. In compliance with the correct technique, OF is a more effective delivery instrument compared with VAS. According to the literature, the frequency of unsuccessful VAS associated with the slipping of the cup can reach 21%–34% [12]. Repeated application of a vacuum extractor cup, VAS failure, and the transition to OF, that is, the use of two operative vaginal techniques on the same fetus, increase the risk of an adverse outcome for the newborn. VAS, from a technical point of view, is a simpler procedure, but it does not release the operator from the obligation to master the technique of applying OF in the event of the cup slipping.

We believe that an increase in the frequency of VAS execution compared with the use of OF is associated with a decrease in the competence level of obstetrician-gynecologists who choose a simpler technique that does not require such highly developed manual skills as for performing an OF surgery. It should also be separately noted that from 2015 to 2018 in St. Petersburg Maternity Hospital No. 13, there were three cases of unsuccessful VAS attempts related to slipping of the cup, as a result of which the delivery of women in labor was performed through OF surgery. These cases were excluded from the study because it is not possible to assign them to a specific group. All newborns, who had two delivery instruments alternately used in the process of birth, had cephalohematomas. There were no serious injuries of the soft birth canal in these puerperae.

Saint Petersburg Maternity Hospital No. 13 specializes in providing medical care to pregnant women, women in labor, and puerperae with diseases of the cardiovascular system. Of our patients, 15%–20% had a history of hypertension. In 70% of cases, vaginal delivery was performed with the use of regional anesthesia. From 2015 to 2018, it was possible to reduce the percentage of abdominal delivery from 25.6% to 21.5%. During this period, the frequency of vaginal operative delivery increased from 1.72% to 3.6%, respectively. Because of the specialization of the institution and the high professional training of personnel, the structure of operative vaginal delivery in St. Petersburg differed significantly from other obstetric institutions. So, in almost 80% of cases, our obstetrician-gynecologists choose the OF surgery but not VAS.

Conclusion

The surgery of applying OF is an effective and safe method of operative vaginal delivery. Unlike VAS, it is associated with a reduced risk of cephalohematoma in the fetus. Blood loss when using OF and VAS in the case of the fetal head on the pelvic diaphragm is comparable.

When using OF in puerperae, an increase in tearing of the vaginal mucosa was noted. At the same time, the course of the postpartum period does not differ with the use of OF and VAS.

In general, OF represent a reliable tool, and it is indispensable in case of severe somatic pathology in a parturient woman and when the need arises for emergency delivery when the fetal head is not higher than a wide part of the pelvic cavity. Surgery of OF application is still performed in obstetric practice, and our study proves that it has certain advantages and is associated with a low frequency of complications. Compliance with the necessary conditions and sequence when applying shoulders, knowledge of the childbirth biomechanics, elaborated manual skills of the operator, and clarity in decision-making are the key to the success and safety of the use of OF in obstetrics.

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