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PROSPECTS FOR INDUCTION OF LABOR WITH OXYTOCIN WITHIN 12 HOURS (PERINATAL CENTER EXPERIENCE)

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ПЕРСПЕКТИВЫ ПРОВЕДЕНИЯ ИНДУКЦИИ РОДОВ ОКСИТОЦИНОМ В ТЕЧЕНИЕ 12 ЧАСОВ (ОПЫТ ПЕРИНАТАЛЬНОГО ЦЕНТРА)

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Objective. Demonstrate the expediency and effectiveness of labor induction for more than 6 hours (up to 12 hours of the latent phase).

Materials and methods. A cohort, descriptive, single-center study was conducted. The effectiveness of labor induction with oxytocin for more than 6 hours was estimated. The birth medical histories of 3265 patients of SBHI of Sverdlovsk Region "Yekaterinburg Regional Perinatal Center" from January 2020 to December 2022, who underwent pre-induction and induction of labor, were analyzed.

Results. The group of patients, who underwent induction of labor with oxytocin, was 2261 cases. In 1269 (56.13 %) patients, vaginal delivery occurred after less than 6 hours of labor induction with oxytocin. In 992 patients (43.87 %) induction of labor with oxytocin was continued for more than 6 hours. Only 320 labors resulted in abdominal delivery due to ineffective labor induction, which amounted to 32.3 % (of the number of labor inductions with oxytocin for more than 6 hours) and 14.2 % (of the total number of labor inductions with oxytocin).

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Conclusions. Induction of labor with oxytocin for more than 6 hours (up to 12 hours of the latent phase) is reasonable and effective. It allows to avoid abdominal delivery in up to 30 % of patients of the study group.

Keywords. Induction of labor, oxytocin, latent phase.

Цель. Показать целесообразность и эффективность проведения индукции родов более 6 ч (до 12 ч латентной фазы).

Материалы и методы. Проведено когортное описательное одноцентровое исследование. Оценивалась эффективность осуществления индукции родов окситоцином более 6 ч. Были проанализированы истории родов 3265 пациенток ГБУЗ СО «ЕКПЦ» с января 2020 г. по декабрь 2022 г., которым проводилась преиндукция и индукция родов.

Результаты. Группа пациенток, подлежащих индукции родов окситоцином, составила 2261 случай. У 1269 (56,13 %) пациенток роды через естественные родовые пути произошли менее чем через 6 ч индукции родов окситоцином. 992 пациентки (43,87 %) продолжили индукцию родов окситоцином более 6 ч. Только 320 родов закончились абдоминальным родоразрешением в связи с неэффективной индукцией, что составило 32,3 % (от числа индукций родов окситоцином более 6 ч) и 14,2 % (от общего числа индукций родов окситоцином).

Выводы. Индукция родов окситоцином более 6 ч (до 12 ч латентной фазы) целесообразна и эффективна. Это позволяет избежать абдоминального родоразрешения до 30 % в исследуемой группе.

Ключевые слова. Индукция родов, окситоцин, латентная фаза.

INTRODUCTION

Induction of labor is a commonly used procedure in obstetrics. Induction of labor is typically performed for medical reasons when prolongation of pregnancy due to maternal illness or complications poses a high risk of adverse maternal and perinatal outcomes. In some cases, elective induction is performed (induction of labor at term without maternal or fetal medical indications, but with the aim to improve outcomes by selecting the optimal time and conditions for the best care)¹.

The use of labor induction is increasing worldwide, with a 6.8 %–35.5 % incidence rate in different countries. On the one hand, the increase is caused by the increasing number of women with high obstetric and perinatal risk, including somatic diseases (diabetes mellitus, obesity). On the other

hand, the increase in the frequency of induction is due to improved outcomes for the mother and fetus, a beneficial effect on reducing the incidence of complications of pregnancy and cesarean section owing to the introduction of new technologies for cervical preparation and labor induction².

Induction of labor is widely used in obstetrics as a method of elective vaginal delivery in case of indications for delivery and the absence of spontaneous labor. However, induction of labor (compared to physiological labor) increases the risk of pathology both in the mother (cesarean section, bleeding, chorioamnionitis) and newborn (fetal distress during labor, asphyxia). Induction of labor is typically performed for medical reasons when prolongation of pregnancy due to maternal illness or complications poses a high risk of adverse maternal or perinatal outcomes [1].

The efficiency of induction and incidence of complications are determined by several factors:

¹ Failed Attempt at Labor Stimulation (cervical preparation and labor induction): clinical recommendations, Moscow (2021).

² Ibid.

- 1) Timing and indications for induction
- 2) Assessment of cervical maturity
- 3) Choice of induction method
- 4) Adequate dosage of drugs used for induction
- 5) Ineffectiveness of induction and timely change of delivery method
- 6) Intrapartum monitoring of the fetal condition [2]

Currently, there is no regulatory document that provides a clear definition of the time for induction of labor with oxytocin. In the Failed Attempt at Labor Stimulation clinical practice guideline (2021), the recommended timing of oxytocin administration is 5–15 hours until active labor is achieved. These frameworks are unclear and remain the prerogative of the medical institution.

The study aimed to demonstrate the feasibility and efficiency of induction of labor for more than 6 hours (up to 12 hours of latent phase).

MATERIALS AND METHODS

A cohort descriptive single-center study was conducted. We assessed the efficiency of induction of labor with oxytocin for more than 6 hours.

The birth histories of 3,265 patients of the Yekaterinburg Regional Perinatal Center who underwent pre-induction and induction of labor between January 2020 and December 2022 were analyzed. The studied cases were divided into two groups: group 1 included patients who underwent pre-induction of labor (cervix at the time of examination on the Bishop scale, < 8 points) and group 2 included patients who did not need preliminary preparation of the

cervix (cervix at the time of examination on the Bishop scale, ≥ 8 points). In groups 1 and 2, 1,991 (61 %) and 1,274 (39 %) cases were analyzed, respectively (Fig. 1).

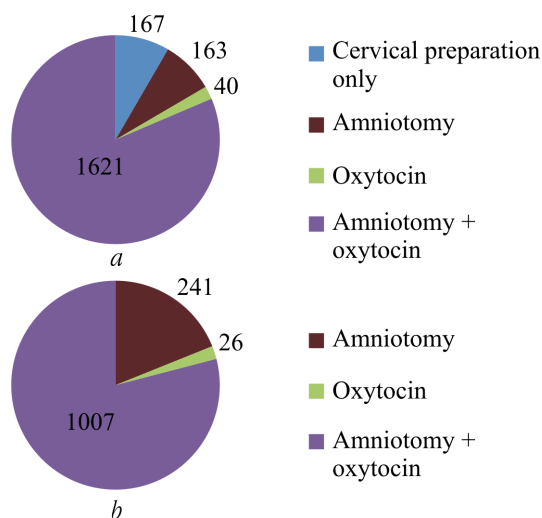


Fig. 1. Induction methods:
a – group 1; b – group 2

Most patients received induction with oxytocin. In the Yekaterinburg Regional Perinatal Center, the induction of labor with oxytocin (low-dose infusion) was designed for 12 hours, subject to the satisfactory condition of the mother and fetus (continuous cardiotocography monitoring for all patients subject to induction of labor with oxytocin; continuous blood pressure monitoring for certain groups of patients and observing for hypertensive disorders and the presence of a scar on the uterus; continuous use of a uterine cardiotocograph sensor to assess the contractile activity of the uterus to prevent tachysystole).

If within 12 hours of induction of labor with oxytocin the patient reaches the active phase of labor (5 cm or more), induction is continued; oxytocin is not terminated in this situation. If after 12 hours the patient

does not reach the active phase of labor, induction is regarded as ineffective, and the labor management plan is revised in favor of abdominal delivery (cesarean section).

RESULTS AND DISCUSSION

We considered a group of female patients subject to labor induction with oxytocin, which enabled assessing more clearly the effectiveness of administering oxytocin for more than 6 hours. In this group, the birth histories of 2,261 patients (including 71 (3.1 %) with a uterine scar after cesarean section) were analyzed. The remaining 1,004 (among 3,265) patients had labor without the use of oxytocin (entered labor independently during pre-induction of labor or after induction of labor by amniotomy and those who required abdominal delivery before induction of labor with oxytocin).

In 1,269 (56.13 %) patients, vaginal delivery occurred after <6 hours of labor induction with oxytocin. If induction of labor with oxytocin had been stopped after 6 hours, the remaining 992 patients (43.87 %) would have required abdominal delivery according to the indication of labor induction with oxytocin without effect. In the present study, this group of patients continued induction of labor with oxytocin for > 6 hours.

Only 320 births ended in abdominal delivery because of ineffective induction of labor, accounting for 32.3 % of the number of inductions of labor with oxytocin for > 6 hours and 14.2 % of the total number of inductions of labor with oxytocin (Fig. 2).

Therefore, induction of labor with oxytocin for >6 hours helped to avoid abdominal delivery in 672 cases, which accounted

for 29.7 % of the total number of inductions of labor with oxytocin, including in patients with a uterine scar.

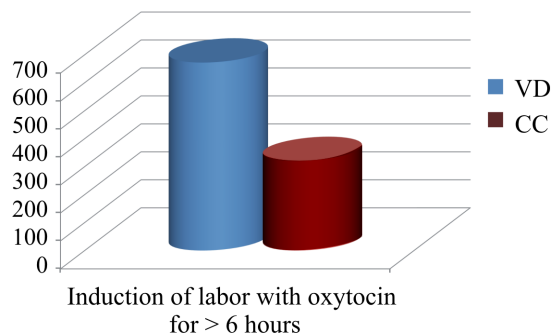


Fig. 2. Results of delivery after induction of labor with oxytocin for >6 hours ($n = 992$).

Note: VD, vaginal delivery; CS, cesarean section

We conducted a comparative analysis of complications of outcomes of vaginal delivery in two groups of patients, in which group 1 received induction of labor with oxytocin for < 6 hours and group 2 received it for > 6 hours. The results are presented in Table 1.

Based on the analysis results, we can conclude that induction of labor for > 6 hours is accompanied by a significant increase in trauma to the birth canal, purulent-septic complications, and operative vaginal delivery. However, considering the percentage of vaginal delivery (67.7 %) in this group of patients, we recommend inducing labor with oxytocin for > 6 hours.

The use of labor induction is increasing worldwide, with a 6.8 %–35.5 % incidence rate in different countries³. For example, in the United States, the rate of labor induction

³ Failed Attempt at Labor Stimulation (cervical preparation and labor induction): clinical recommendations, Moscow (2021).

Table 1

Comparative analysis of complications of vaginal delivery outcomes

Complications		Control group ($n = 1,269$) Oxytocin less than 6 hours n (%)	Study group ($n = 672$) Oxytocin more than 6 hours n (%)	p
Hemorrhage more than 1,000 ml (n)		103 (8.1)	84 (12.5)	0.002*
Severe neonatal asphyxia (n)		5 (0.4)	4 (0.6)	0.788
Shoulder dystocia (n)		11 (0.9)	6 (0.9)	0.844
Injuries (n) including by type:		645 (50.8)	465 (69.2)	< 0.001*
	Hystercervicorrhesis (n)	103 (16.0)	86 (18.4)	0,307
	Perineal rupture degree 1–2 (n)	408 (63.3)	268 (57.7)	0,068
	Perineal rupture degree 3 (n)	6 (0.9)	4 (0.9)	0,760
	Perineal rupture degree 4 (n)	0 (0)	0 (0)	1,0
	Deep vaginal laceration (n)	50 (7.8)	31 (6.7)	0,570
	Episiotomy (n)	78 (12.0)	76 (16.3)	0,054
Purulent-septic complications (n) including by type:		7 (0.6)	16 (2.4)	< 0.001*
	Chorioamnionitis (n)	7 (100)	16 (100)	1,0
	Endometritis (n)	0 (0)	0 (0)	1,0
Operative vaginal delivery (n)		126 (9.9)	107 (15.9)	< 0.001*

Note: *, differences are significant.

increased from 9.6 % in 1990 to 25.7 % in 2018 [3]. This is due to the expansion of the list of indications for programmed childbirth and the latest research data that elective induction of labor at week 39 compared with expectant management (until a gestational age of more than 41 weeks) significantly reduced the risk of delivery by cesarean section (13.9 % vs 35.9 %), maternal morbidity (16.5 % vs 21.2 %), stillbirth (0 % vs 0.13 %), risk of maternal infection (2.8 % vs 5.2 %), and risk of transfer of newborns to the intensive care unit (3.5 % vs 5.5 %) [4–5]. Currently, the UK clinical guidelines state that requests for induction of labor can be considered only after discussing the benefits and risks with the woman, taking into account her circumstances and preferences [6].

Considering all the abovementioned, crucial questions about the duration of la-

bor induction with oxytocin and at what stage it should be considered ineffective arise. According to the “Failed Attempt at Labor Stimulation” clinical guidelines (2021), the lack of effect of oxytocin administration is manifested by the absence of labor and dynamics of cervical dilatation within 3–5 hours or the inability to achieve the active phase of labor within 5–15 hours. The definition is relatively vague and the time frame is extremely broad, especially because the latent phase of labor is significantly longer in induced labor compared to spontaneous labor, and the diagnosis of “no effect up to 6 cm” in women undergoing induction should be made with caution (Table 2). During the active phase of stage 1 of labor, no significant difference was detected [7].

Table 2

Comparative study results

Parameter	Value							
Dilatation, cm	4–10	3–4	4–5	5–6	6–7	7–8	8–9	9–10
Induction	5.5	1.4	1.3	0.6	0.4	0.2	0.2	0.3
Spontaneous delivery	3.8	0.4	0.5	0.4	0.3	0.3	0.2	0.3

Based on the study results, we believe that it is reasonable not to consider induction of labor ineffective in the latent phase until oxytocin is administered at least 12 hours after membrane rupture [1].

CONCLUSIONS

Induction of labor with oxytocin for > 6 hours (up to 12 hours of the latent phase) is appropriate and effective. It was beneficial for avoiding abdominal delivery in up to 30 % of the study patients, which, in turn, prevented a further increase in the number of patients with a uterine scar after cesarean section.

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