



## Article

# Some aspects of trauma during childbirth in pregnant women with chronic intrauterine infection

Karimova F.D. \*<sup>1</sup> , Atahanov Sh.E. <sup>1</sup> , Radzhabova Z.A. <sup>1</sup> , Rakhmanova I.I. <sup>1</sup> 

<sup>1</sup> Center for the development of professional qualification of medical workers, Tashkent, 100042, Uzbekistan  
karimovafiruza72@yandex.com (K.D.), atahanovsh@gmail.com (A.E.), radzhabovaz@gmail.com (R.A.),  
rakhmanovai@gmail.com (R.I.)

\* Correspondence: karimovafiruza72@yandex.com; Tel: +998 (94) 6505155 (K.D.)

**Abstract:** This study investigates the clinical and histologic characteristics of cervical ruptures during labor in women with chronic intrauterine infections. After analyzing the data of 82 women after delivery, the authors of the study found a high incidence of cervical rupture, especially in first-pregnant women, as well as extragenital diseases and a history of gynecological problems. The study emphasized that 64.6% of cases had first-degree tears and 35.4% had second-degree tears, often accompanied by varying degrees of bleeding. Histologic studies revealed inflammatory changes in all cases of cervical rupture, and necrotic areas were observed in 63.4%. The findings indicate that cervical ruptures are a significant source of postpartum infections and can lead to long-term anatomical and functional complications. Emphasizing the importance of surveillance of women with complicated pregnancies, the authors of this study advocate proactive measures for infection screening and postpartum cervical screening to reduce the risks associated with cervical trauma.

**Purpose of the study:** to determine the characteristic clinical and histologic features of the cervix after its rupture during labor.

**Materials and Methods.** 82 postpartum women with cervical rupture in labor were examined. The age of the women ranged from 19 to 36 years, with a mean age of 26.8±6.26 years. Out of the total number of postpartum women, 80.5%, i.e. majority, were primiparous. Cervical rupture of the first degree was diagnosed in 64.6% of cases, and in 35.4% of cases - of the second degree. The causes of cervical rupture were premature straining - 31.7% of cases, abortion history - 28.0% of cases, presence of infections in the uterus - 25.7%, combination of 2 causes - 8.5% of cases, 3 causes - 6.1% of cases. The control group consisted of 25 women of similar age but without cervical rupture during labor. Cervical ruptures were diagnosed during examination of the birth canal in the early postpartum period. Anamnestic data on gynecologic diseases and the course of pregnancy were collected from the examined women. Biopsy specimens obtained at colposcopy were subjected to histologic examination.

**Results.** Histologic analysis revealed inflammatory changes in all cases, and in 63.4% - necrotic areas, indicating a high risk of infections. Complications during labor were common, including prolonged labor and labor weakness, especially in women with concomitant extragenital diseases. Overall, cervical rupture was associated with significant postpartum risks, emphasizing the need for careful observation and management.

**Conclusion.** These findings suggest a strong association between cervical trauma and subsequent inflammatory changes that can lead to serious postpartum complications, including infections. Strategies for proactive monitoring and management of women at risk need to be implemented to reduce these risks. Ultimately, addressing the factors contributing to cervical rupture may improve maternal health in the postpartum period.

**Keyword:** Cervical rupture, labor, chronic intrauterine infection, pregnancy.

**Quoting:** Karimova F.D., Atahanov Sh.E., Radzhabova Z.A., Rakhmanova I.I. Uzbek Journal of Medical Science and Education. 5-9. <https://doi.org/>

Received: 10.01.2024  
Corrected: 18.01.2024  
Accepted: 25.03.2024  
Published: 30.03.2024

**Copyright:** © 2025 by the authors. Submitted to for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## Introduction

It is known that trauma to the birth canal is the cause of postpartum hemorrhage and ranks second in frequency of occurrence after hypotonic hemorrhage. According to various studies, the

incidence of cervical rupture during childbirth ranges from 5 to 30% [1,2,6]. In the Republic of Uzbekistan today, birth trauma and issues of preventing birth trauma are of high relevance not only in terms of reducing maternal mortality, but also in terms of studying possible complications. The implementation of protocols for the prevention and control of postpartum hemorrhage is of great importance. Among the causes of postpartum hemorrhage, trauma-rupture of soft tissues is of particular importance. Soft tissues, in particular the cervix, are exposed to the greatest traumatic effects. The wounds formed as a result of rupture of the cervix create favorable conditions for infection, which in turn leads to the occurrence of a local inflammatory process, i.e. cervicitis, which can contribute to the transition of the inflammatory process to the internal genital organs [1,2]. It is possible that in the future, cervical ruptures, regardless of the degree of wound healing, can lead to changes in anatomical and functional nature. It has been established that an untreated rupture heals by scarring, the cervix is deformed, the cervical canal is not formed, the exposed anterior and posterior lips diverge, ectropion is formed, the mucous plug in the canal cannot be retained, which contributes to the disruption of the barrier function against the penetration of infection into the uterine cavity. Taken together, this leads to the occurrence of long-term follicular-papillary erosions [1,3,6]. However, not every cervical injury during childbirth has clinical significance, i.e. complications do not always occur in the near or distant future. In this regard, studying the condition of the cervix after rupture during childbirth is important.

The purpose of the work was to determine the characteristic clinical and histological features of the cervix after its rupture during childbirth.

#### **Materials and Methods**

82 postpartum women with cervical rupture during childbirth were examined. The women were aged from 19 to 36 years, the average age was  $26.8 \pm 6.26$  years. Of the total number of postpartum women, 80.5%, i.e. the majority were primiparous. In 64.6% of cases, degree I cervical rupture was diagnosed, in 35.4% of cases - II degree. The causes of cervical rupture were premature straining - 31.7% of cases, a history of abortion - 28.0% of cases, the presence of infections in the uterus - 25.7%, a combination of 2 reasons - 8.5% of cases, 3 reasons - 6.1% of cases. The control group consisted of 25 women of similar age, but without cervical rupture during childbirth. Cervical ruptures were diagnosed during examination of the birth canal in the early postpartum period. The examined women had anamnesis data regarding past gynecological diseases, and also the course of pregnancy. Biopsy samples obtained by biopsy during colposcopy were subjected to histological examination. When performing a biopsy, the cavity of the mucous membrane of the cervical canal was curetted. Subsequently, the macropreparation was fixed, embedded in paraffin, after which ultrathin sections were prepared from it, which were placed on glass slides, the paraffin was removed, and the microspecimen was stained with hematoxylin-eosin and viewed under different microscope magnifications. Interpretation of microscopy results was carried out according to the CIN and Bethesda classification system [4,5].

Statistical processing was carried out using the program "Statistica for Windows" v.6. The difference was assessed as significant if the probability of possible error was  $>0.05$ .

Research results and discussion. Clinical studies have shown that the age of the majority of the examined women in labor was optimal for childbirth (25-30 years). Extragenital diseases occurred in 55 (67.1%) postpartum women. These were mainly diseases of the urinary system, endocrine diseases and diseases of the respiratory system. According to the anamnesis, 65 (79.3%) of the examined women suffered gynecological diseases. Analysis of the structure of gynecological diseases showed the predominance of inflammatory diseases. In postpartum women with cervical rupture, gynecological diseases such as cervicitis and cervical ectopia were 2.8 and 2.4 times more likely to occur, compared with the control group (Table 1).

As can be seen from the table, the most common pathology was inflammatory diseases of the urinary tract, cystitis; pyelonephritis was noted in 67.1% of women in the main group and 28% in the control group. Respiratory infections were noted in 29.3% of cases in the main group. Apparently, the unfavorable infectious background caused the pathological course of labor, which was realized in the high frequency of prenatal rupture of amniotic fluid, which amounted to 29% in the main group. In the anamnesis, 65 (79.3%) patients in the main group and 36% in the control group had a high frequency of gynecological diseases. In terms of occurrence, the most common

**Table 1.** Clinical characteristics of the examined postpartum women

Index	Main group (n=82)	Control (n=25)
Age, years		
19-24	18 (22%)	6 (24%)
25-30	42 (51,2%)	13 (52%)
31-36	22 (26,8%)	6 (24%)
Primipara:		
Primigravidas, primigravidas,	66 (80,5%)	19 (76%)
multigravidas	36 (43,9%)	11 (44%)
primiparous	30 (36,5%)	8 (32%)
Multiparous	16 (19,5%)	6 (24%)
Extragenital diseases:		
cystitis, pyelonephritis	55 (67,1%)*	7 (28%)
goiter, overweight	10 (12,2%)*	1 (4%)
goiter, overweight	10 (12,2%)	-
ARVI, tonsillitis, rhinitis, bronchitis	24 (29,3%)*	4 (16%)
allergy	7 (8,5%)	2 (8%)
gastritis, colitis	gastritis, colitis	-
Gynecological diseases:	65 (79,3%)*	9 (36%)
colpitis	9 (11,0%)	2 (8%)
salpingo-oophoritis	9 (11,0%)	2 (8%)
cervicitis	28 (34,1%)*	3 (12%)
cervical ectopia	8 (9,8%)*	1 (4%)
inflammatory problem + ectopia	11 (13,4%)*	1 (4%)

pathology was chronic cervicitis (34.1%); inflammatory diseases of the uterine appendages in 11% and combined pathology of the cervix ectopia in 13.4% of cases in the main study group. Given the unfavorable medical history, special attention in the study was given to the study of complications of this pregnancy. Complicated pregnancy was noted by 53 (64.6%) women in the main group and 7 (28.0%) women in the control group (Table 2).

**Table 2.** Frequency of occurrence of pregnancy complications in the examined groups

Index	Main group (n=82)	Control group (n=25)
Mild preeclampsia	20 (24,4%)	4 (16,0%)
Threat of miscarriage	12 (14,6%)	3 (12,0%)
Isthmic-cervical insufficiency	8 (1,21%)	-
Anemia	22 (26,8%)	1 (4,0%)

From the data presented in the table it follows that women in the main group had mild preeclampsia significantly more often (24.4%). In the main group, anemia was detected more often (26.8%). Signs of polyhydramnios according to ultrasound data were noted by 28% of the main study group.

The duration of labor in the examined group patients ranged from 6 hours 20 minutes to 12 hours 45 minutes and averaged 8 hours 50 minutes. There were no significant differences between the groups. Analysis of the duration of labor showed that in the main group of postpartum women, rapid labor was observed in 15 women (18.3%), and in the control group - in 2 (8.0%) women, i.e. 2.3 times less often. Prolonged labor (over 12 hours) occurred in 22 (26.8%) and 1 (4.0%) postpartum women in the main and control groups, respectively. The course of labor was complicated by weakness of labor, which occurred in 35 (42.7%) women of the main group. At the same time, primary weakness was observed in 22 (26.9%), secondary weakness - in 13 (15.8%) women in labor. Discoordination of labor developed in 6 (7.3%) women in labor in the main group. Induction of labor was performed in 12 (14.6%) women in the main group and 1 (4.0%) in the control group, i.e. 3.6 times more often in postpartum women of the main group. The indication for induction of labor was prenatal rupture of amniotic fluid and a prolonged latent period. Childbirth in the control group proceeded without complications.

The duration of the anhydrous interval averaged 8 hours 50 minutes  $\pm$  22 minutes in the main group and 3 hours 55 minutes  $\pm$  15 minutes in the control group. As part of the study, in the postpartum period, the birth canal was examined, it was noted that cervical ruptures of the 1st degree in 53 (64.6%) women in the main group were asymptomatic, bleeding was noted in 29 (35.3%) women with cervical ruptures of the 2nd degree. . Bleeding varied in intensity from slight in 19 (23.2%) to heavy in 10 (12.2%) women. Histological examination of biopsy specimens revealed cellular changes in all 82 (100%) postpartum women with cervical rupture, and in 5 (20.0%) in the control group. According to the CIN and Bethesda classification system, minor or benign cellular changes were inflammatory changes, i.e. All postpartum women with cervical rupture had inflammatory changes, and in 63.4% of cases there were areas of necrosis. In the control group, inflammatory changes were observed in women who had received treatment for cervicitis before this pregnancy. No necrotic areas were noted in the microslides of this group.

The results obtained once again confirmed that cervical ruptures are a favorable condition for infection, as evidenced by the predominance of inflammatory processes in the ectocervix. Our data are consistent with the results of other researchers [1,3].

Thus, based on our results, it has been established that cervical rupture is more often observed in first birth. It was revealed that cervical rupture is most favored by the presence of extragenital diseases, especially diseases of the respiratory, urinary system and endocrine diseases. To a large extent, the risk factor for cervical rupture was previous gynecological diseases, especially diseases of the respiratory, urinary and endocrine systems. Complicated pregnancy also affects the formation of cervical rupture, as evidenced by the significantly high incidence of inflammatory diseases of the urinary tract and isthmic-cervical insufficiency in postpartum women of the main group. One of the reasons contributing to the formation of cervical rupture is the long duration of the anhydrous interval.

Histological structure of the cervix after its rupture during childbirth. Cervical ruptures are dangerous not only because they cause bleeding, but are also a source of ascending infection in the postpartum period. Bleeding from the cervix usually occurs from arterial branches. In this case, the blood is bright red, and it differs from venous blood flowing from the vessels of the uterus. All this can subsequently lead to cicatricial deformation, which can contribute to cervical inversion, the development of pseudo-erosions and other background conditions for cervical cancer. Studies have shown that the main clinical signs of the risk of developing cervical rupture during childbirth are a combination of first birth, aggravated extragenital and gynecological history, complicated pregnancy, and a long anhydrous interval. Histological signs are inflammatory changes. Thus, during clinical observation during pregnancy, it is advisable to carry out infectious screening and sanitation of the genital tract, and after childbirth - examination of the cervix.

#### **Ethics approval.**

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Approval was obtained from the Institutional Review Board of the Development Center for Advanced Training of Medical Workers of the Ministry of Healthcare of ensuring compliance with ethical standards for research involving human subjects. Informed consent was obtained from all participants prior to their inclusion in the study, and all data were anonymized to protect participant confidentiality.

#### **Consent for publication.**

All participants in this study provided informed consent for publication of their anonymized data. Participants were informed about the purpose of the research, the use of their data in scientific publications, and their right to withdraw consent at any time without any consequences. The consent was documented, and all efforts were made to ensure the confidentiality of personal information in the published material.

#### **Data Availability Statement**

The data that support the findings of this study are available upon reasonable request from the corresponding author. Due to privacy and ethical considerations, individual participant data will be shared only after de-identification and in compliance with applicable data protection regulations. Aggregate data and summary statistics are included in the published manuscript.

### **Acknowledgments**

The authors would like to express their gratitude to the staff at the Development Center for Advanced Training of Medical Workers of the Ministry of Healthcare of Uzbekistan for their invaluable support in conducting this study. We also thank the participating women for their willingness to share their experiences and contribute to this research. Special thanks to the laboratory team for their assistance with histological analyses and to our colleagues who provided valuable insights throughout the study.

### **Conflict of interest**

The authors declare that they have no competing interests or conflicts of interest related to this study. All authors have disclosed any financial or personal relationships that could potentially influence the research, and there are no affiliations or financial incentives that could be perceived as influencing the outcomes of this work.

### **References**

1. Kulakov V.I., Butova E.A. Obstetric traumatism of soft tissues of the birth canal. Moscow: Medical Information Agency; 2003. 128 p.
2. Karimova F.D. Regulation of labor anomalies during rupture of amniotic fluid. Uzbekistan 2006. News of Dermatovenirology 2006, 27–29 pp.
3. Yachmenev N.P. Condition of the cervix after its rupture during childbirth: Author's abstract of the dissertation for the degree of Candidate of Medical Sciences. Moscow; 2008. 24 p.
4. Herbert A., Arbyn M., Bergeron C. Why CIN3 and CIN2 should be distinguished on histological reports. Cytopathology 2008, 19, 63–64.
5. Kocjan G., Priollet B.C., Desai M. BSCC, Bethesda or other? Terminology in cervical cytology: European panel discussion. Cytopathology 2005, 16, 113–119.
6. Young B., Takoudes T., Lim K.H., Rana S. Rupture of the posterior cul-de-sac during spontaneous labor. Obstetrics and Gynecology 2010, 115(2), 414

**Disclaimer of liability/Publisher's Note:** The statements, opinions and data contained in all publications belong exclusively to individuals. The authors and participants, and the Magazine and the editors. The magazine and the editors are not responsible for any damage caused to people or property resulting from any ideas, methods, instructions or products mentioned in the content.