

World Journal of *Clinical Cases*

World J Clin Cases 2020 August 26; 8(16): 3377-3620



OPINION REVIEW

- 3377** Novel computerized psychometric tests as primary screening tools for the diagnosis of minimal hepatic encephalopathy
Luo M, Mu R, Liu JF, Bai FH

REVIEW

- 3390** Management of cancer patients during COVID-19 pandemic at developing countries
González-Montero J, Valenzuela G, Ahumada M, Barajas O, Villanueva L

MINIREVIEWS

- 3405** Liver in the limelight in the corona (COVID-19) time
Chela HK, Pasha SB, Basar O, Daglilar E, Tahan V
- 3411** Steroid-responsive pancreatitides
Pelaez-Luna M, Soriano-Rios A, Lira-Treviño AC, Uscanga-Domínguez L

ORIGINAL ARTICLE

Clinical and Translational Research

- 3431** Application of molybdenum target X-ray photography in imaging analysis of caudal intervertebral disc degeneration in rats
Su QH, Zhang Y, Shen B, Li YC, Tan J
- 3440** Accuracy study of a binocular-stereo-vision-based navigation robot for minimally invasive interventional procedures
Wang R, Han Y, Luo MZ, Wang NK, Sun WW, Wang SC, Zhang HD, Lu LJ

Retrospective Study

- 3450** Value of virtual bronchoscopic navigation and transbronchial ultrasound-guided sheath-guided exploration in diagnosis of peripheral lung cancer
Liu Y, Wang F, Zhang QC, Tong ZH
- 3458** Significance of serum fibroblast growth factor-23 and miR-208b in pathogenesis of atrial fibrillation and their relationship with prognosis
Chen JM, Zhong YT, Tu C, Lan J
- 3465** Home quarantine compliance is low in children with fever during COVID-19 epidemic
Lou Q, Su DQ, Wang SQ, Gao E, Li LQ, Zhuo ZQ

- 3474** Combination of endoscopic submucosal dissection and laparoscopic sentinel lymph node dissection in early mucinous gastric cancer: Role of lymph node metastasis

Li H, Zhao LL, Zhang XC, Liu DX, Wang GY, Huo ZB, Chen SB

- 3483** Factors affecting failed trial of labor and countermeasures: A retrospective analysis

Wang JG, Sun JL, Shen J

- 3493** Value of miR-1271 and glypican-3 in evaluating the prognosis of patients with hepatocellular carcinoma after transcatheter arterial chemoembolization

Guo Z, Wang J, Li L, Liu R, Fang J, Tie B

Observational Study

- 3503** Follow-up study on symptom distress in esophageal cancer patients undergoing repeated dilation

Liu L, Liu QW, Wu XD, Liu SY, Cao HJ, Hong YT, Qin HY

- 3515** Long-term medical treatment of patients with severe burns at exposed sites

Du Y, Lv GZ, Yu S, Wang D, Tan Q

CASE REPORT

- 3527** Laparoscopic management of a giant mucinous benign ovarian mass weighing 10150 grams: A case report

Sanna E, Madeddu C, Melis L, Nemolato S, Macciò A

- 3534** Concurrent hepatocellular carcinoma metastasis to stomach, colon, and brain: A case report

Kim R, Song J, Kim SB

- 3542** Disseminated osteomyelitis after urinary tract infection in immunocompetent adult: A case report

Kim YJ, Lee JH

- 3548** Pelvic lipomatosis and renal transplantation: A case report

Zhao J, Fu YX, Feng G, Mo CB

- 3553** Intestinal obstruction in pregnancy with reverse rotation of the midgut: A case report

Zhao XY, Wang X, Li CQ, Zhang Q, He AQ, Liu G

- 3560** Clinical laboratory investigation of a patient with an extremely high D-dimer level: A case report

Sun HX, Ge H, Xu ZQ, Sheng HM

- 3567** Recovery from a biliary stricture of a common bile duct ligature injury: A case report

Fan Z, Pan JY, Zhang YW

- 3573** Spontaneous pneumomediastinum in an elderly COVID-19 patient: A case report

Kong N, Gao C, Xu MS, Xie YL, Zhou CY

- 3578** Acute generalized exanthematous pustulosis with airway mucosa involvement: A case report

Li LL, Lu YQ, Li T

- 3583** Multifocal neuroendocrine cell hyperplasia accompanied by tumorlet formation and pulmonary sclerosing pneumocytoma: A case report
Han XY, Wang YY, Wei HQ, Yang GZ, Wang J, Jia YZ, Ao WQ
- 3591** Giant benign phyllodes breast tumour with pulmonary nodule mimicking malignancy: A case report
Zhang T, Feng L, Lian J, Ren WL
- 3601** Spontaneous multivessel coronary artery spasm diagnosed with intravascular ultrasound imaging: A case report
Wu HY, Cao YW, Chang FJ, Liang L
- 3608** Delayed perforation after endoscopic resection of a colonic laterally spreading tumor: A case report and literature review
Zhou GYJ, Hu JL, Wang S, Ge N, Liu X, Wang GX, Sun SY, Guo JT
- 3616** First branchial cleft cyst accompanied by external auditory canal atresia and middle ear malformation: A case report
Zhang CL, Li CL, Chen HQ, Sun Q, Liu ZH

ABOUT COVER

Editorial board member of *World Journal of Clinical Cases*, Dr. Kvolik is a Professor in the School of Medicine, Osijek University, Croatia. She obtained her MD degree, with specialization in the field of anesthesiology, resuscitation and intensive care from the Zagreb Medical School, Croatia. Afterwards, she undertook postgraduate training in Clinical Pharmacology at the same institution, defending both a Master's thesis and PhD thesis. In 2006, she joined the Osijek University Medical Faculty as a lecturer and was promoted to Professor in 2009. In 2012, she was elected Head of the Department of Anesthesiology, Resuscitation, Intensive Care and Pain Therapy, a position she occupies to this day. She is also the current Head of the Intensive Care Unit at the Osijek University Hospital, Croatia. (L-Editor: Filipodia)

AIMS AND SCOPE

The primary aim of *World Journal of Clinical Cases* (*WJCC*, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

INDEXING/ABSTRACTING

The *WJCC* is now indexed in Science Citation Index Expanded (also known as SciSearch®), Journal Citation Reports/Science Edition, PubMed, and PubMed Central. The 2020 Edition of Journal Citation Reports® cites the 2019 impact factor (IF) for *WJCC* as 1.013; IF without journal self cites: 0.991; Ranking: 120 among 165 journals in medicine, general and internal; and Quartile category: Q3.

RESPONSIBLE EDITORS FOR THIS ISSUE

Production Editor: Ji-Hong Lin; Production Department Director: Xiang Li; Editorial Office Director: Jin-Lai Wang.

NAME OF JOURNAL

World Journal of Clinical Cases

ISSN

ISSN 2307-8960 (online)

LAUNCH DATE

April 16, 2013

FREQUENCY

Semimonthly

EDITORS-IN-CHIEF

Dennis A Bloomfield, Sandro Vento, Bao-Gan Peng

EDITORIAL BOARD MEMBERS

<https://www.wjgnet.com/2307-8960/editorialboard.htm>

PUBLICATION DATE

August 26, 2020

COPYRIGHT

© 2020 Baishideng Publishing Group Inc

INSTRUCTIONS TO AUTHORS

<https://www.wjgnet.com/bpg/gerinfo/204>

GUIDELINES FOR ETHICS DOCUMENTS

<https://www.wjgnet.com/bpg/GerInfo/287>

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH

<https://www.wjgnet.com/bpg/gerinfo/240>

PUBLICATION ETHICS

<https://www.wjgnet.com/bpg/GerInfo/288>

PUBLICATION MISCONDUCT

<https://www.wjgnet.com/bpg/gerinfo/208>

ARTICLE PROCESSING CHARGE

<https://www.wjgnet.com/bpg/gerinfo/242>

STEPS FOR SUBMITTING MANUSCRIPTS

<https://www.wjgnet.com/bpg/GerInfo/239>

ONLINE SUBMISSION

<https://www.f6publishing.com>



Retrospective Study

Factors affecting failed trial of labor and countermeasures: A retrospective analysis

Jin-Guang Wang, Jing-Li Sun, Jian Shen

ORCID number: Jin-Guang Wang 0000-0002-8430-1593; Jing-Li Sun 0000-0003-1285-7645; Jian Shen 0000-0002-3374-7958.

Author contributions: All authors helped to perform the research; Wang JG wrote the manuscript, performed the procedures, and analyzed and interpreted the data; Sun JL designed the research; Shen J collected the materials and clinical data from patients.

Supported by Liaoning Provincial Natural Science Foundation Guidance Program, No. 2019-ZD-1037.

Institutional review board statement: This study was reviewed and approved by the Ethics Committee of the General Hospital of Northern Theater Command (Heping Campus).

Informed consent statement: All study participants, or their legal guardian, provided informed written consent prior to study enrollment.

Conflict-of-interest statement: We have no conflicts of interest to disclose.

Data sharing statement: No additional data are available.

Jin-Guang Wang, Jing-Li Sun, Jian Shen, Department of Obstetrics and Gynecology, General Hospital of Northern Theater Command (Heping Campus), Shenyang 110000, Liaoning Province, China

Corresponding author: Jing-Li Sun, MAMS, Chief Physician, Department of Obstetrics and Gynecology, General Hospital of Northern Theater Command (Heping Campus), No. 5 Guangrong Street, Heping District, Shenyang 110000, Liaoning Province, China. zg3416@sina.com

Abstract

BACKGROUND

Vaginal delivery is the ideal mode of delivery for the termination of a pregnancy. However, the cesarean section rate in China is much higher than the published by the World Health Organization in the *Lancet* in 2010.

AIM

To retrospectively analyze the factors related to failed trial of labor and the clinical indications for cesarean section conversion, explore how to promote the trial of labor success rate, and determine the feasibility of reducing the rate of conversion to cesarean section.

METHODS

A retrospective analysis was performed on 9240 maternal women who met vaginal delivery conditions and required a trial of labor from January 2016 to December 2018 at our hospital. Among them, 8164 pregnant women who had a successful trial of labor were used as a control group, and 1076 pregnant women who had a failed trial of labor and converted to an emergency cesarean section were used as an observation group. The patients' clinical data during hospitalization were collected for comparative analysis, the related factors of the failed trial of labor were discussed, and reasonable prevention and resolution strategies were proposed to increase the success rate of trial of labor.

RESULTS

The analysis revealed that advanced age (≥ 35 years old), macrosomia (≥ 4000 g), delayed pregnancy (≥ 41 wk), use of uterine contraction drugs, primipara, and fever during labor were associated with conversion to an emergency cesarean section in the failed trial of labor. Multivariate regression analysis showed that age, gestational age, primipara, use of uterine contraction drugs, fever during

Open-Access: This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>

Manuscript source: Unsolicited manuscript

Received: April 7, 2020

Peer-review started: April 7, 2020

First decision: April 22, 2020

Revised: May 4, 2020

Accepted: July 14, 2020

Article in press: July 14, 2020

Published online: August 26, 2020

P-Reviewer: Awad Z, Martelotto S

S-Editor: Wang JL

L-Editor: Wang TQ

P-Editor: Liu JH



birth, and newborn weight led to a higher probability of conversion to an emergency cesarean section in the failed trial of labor. The analysis indicated that the following clinical indications were associated with the conversion to cesarean section in the failed trial of labor: Fetal distress (44.3%), social factors (12.8%), malpresentation (face presentation, persistent occipitoposterior position, and persistent occipitotransverse position) (9.4%), and cephalopelvic disproportion (8.9%).

CONCLUSION

The conversion to emergency cesarean section in failed trial of labor is affected by many factors. Medical staff should take appropriate preventive measures for the main factors, increase the trial of labor success rate, improve the quality of delivery, ensure the safety of mother and child during the perinatal period, and improve the relationship between doctors and patients.

Key words: Trial of labor; Vaginal delivery; Cesarean section; Dystocia; Retrospective analysis

©The Author(s) 2020. Published by Baishideng Publishing Group Inc. All rights reserved.

Core tip: The cesarean section rate in China is much higher than the threshold of the World Health Organization. The purpose of this study was to explore how to promote the success rate of trial of labor, and determine the feasibility of reducing the rate of conversion to cesarean section.

Citation: Wang JG, Sun JL, Shen J. Factors affecting failed trial of labor and countermeasures: A retrospective analysis. *World J Clin Cases* 2020; 8(16): 3483-3492

URL: <https://www.wjgnet.com/2307-8960/full/v8/i16/3483.htm>

DOI: <https://dx.doi.org/10.12998/wjcc.v8.i16.3483>

INTRODUCTION

After China's two-child policy was fully liberalized, the country officially entered the "universal two-children" era, and the obstetrics industry faced enormous challenges brought about by the birth peak. Vaginal delivery is the ideal mode of delivery for the termination of a pregnancy. Cesarean section is only a means of solving dystocia and saving the lives of mothers and children, rather than the usual mode of delivery. In recent years, with the attention of the state and the Ministry of Health, the cesarean section rate has decreased^[1]. In 2010, the rate of cesarean section in China was 46%, and in 2018, it was 36.7%. However, the cesarean section rate in China is much higher than the 10-15% threshold cesarean section rate published by the World Health Organization in the *Lancet* in 2010^[2-4]. Cesarean section is an invasive procedure, and the potential risk is much higher than that of natural delivery. Studies have shown that maternal risk of infection, bleeding, long-term scar pregnancy, placenta previa, and placenta increta are increased after cesarean section. At the same time, the risk delivering newborns who need to enter the neonatal intensive care units, and having children with overweight, obesity, type 1 diabetes, asthma, *etc.* is also increased^[2,5-8]. Therefore, it is necessary to strictly control the indications for cesarean section in the vaginal delivery process, rationally apply cesarean section, improve the quality of obstetric work, and ensure the safety of mother and child in the perinatal period. This study retrospectively analyzed the clinical data of pregnant women with vaginal trials of labor at our hospital in recent years and explored the reasons for the conversion to cesarean section in the failed trial of labor and the corresponding solutions, with an aim to promote the success rate of vaginal trial of labor, provide a new basis for the prenatal prediction by clinicians, and improve perinatal results.

MATERIALS AND METHODS

Subjects

A total of 9240 women who met the criteria for vaginal delivery and required vaginal trials at our hospital from January 2016 to December 2018 were selected. Among them, 8164 pregnant women with a successful trial of labor were used as a control group, and 1076 pregnant women who converted to emergency cesarean section in the failed trial of labor were used as an observation group. The pregnant women in the control group were aged 16 to 44 years, with an average age of 29.13 ± 3.45 years; gestational age was 230 to 295 d, with an average of 277.59 ± 7.18 d. The pregnant women in the observation group were 18-44 years old, with an average age of 29.33 ± 3.04 years; gestational age was 240-294 d, with an average of 279.85 ± 7.01 d. All pregnant women and their families provided informed consent for vaginal delivery.

Methods

The inclusion criteria for the control group were as follows: Single fetal head position pregnancy; gestational age > 28 wk; no vaginal delivery contraindications; and patients requiring vaginal delivery. The exclusion criteria were: Vaginal delivery contraindications; patients insisting on cesarean section to terminate pregnancy; and severe medical or surgical complications. The observation group was required to meet the above selection criteria, plus the failure of the vaginal trial of labor. The hospital electronic medical record system was reviewed, and the following factors were recorded to investigate their effects on the conversion to cesarean section in the failed vaginal trial of labor: Age (years), parity (times), painless delivery, termination of gestational age (days), amniotic fluid condition, maternal fever, neonatal weight (g), scarred uterus, use of oxytocin, stagnation or prolongation of labor, cephalopelvic disproportion, fetal distress, induction of labor failure, placental factors (placenta previa, placental abruption), fetal heart condition, *etc.*

Statistical analysis

Statistical analyses of the data were performed using SPSS 22.0 statistical software. The count data were represented by n (%), and the χ^2 test was performed. The measurement data were represented by the mean $\pm$ SD, and the t test was performed. $P < 0.05$ was considered statistically significant.

RESULTS

Risk factors for conversion to cesarean section in failed trial of labor

Univariate analysis showed statistically significant differences between the two groups in age, parity, primipara, fever during birth, neonatal weight, termination of gestational age, and use of uterine contraction drugs ($P < 0.05$). The above factors were related to the failure of the vaginal trial of labor (Tables 1 and 2).

Multivariate analysis of conversion to cesarean section in failed trial of labor

Multivariate analysis showed that the differences between the control group and the observation group were statistically significant ($P < 0.05$) in the following factors: Termination of gestational age; primipara; use of labor analgesia; fever during labor; neonatal weight; and use of uterine contractions drugs. These factors were related to the failed trial of labor and were the most important factors affecting the conversion to emergency cesarean section in failed trial of labor, as shown in Table 3.

Indication analysis of conversion to cesarean section in failed trial of labor

The main indications for the cesarean section of the observation group included fetal distress in 447 (44.3%) cases, social factors in 138 (12.8%), malpresentation in 101 (9.4%; face presentation, persistent occipitoposterior position, and persistent occipitotransverse position), and cephalopelvic disproportion in 96. Among the indications for cesarean section caused by fetal distress, there were 475 newborns (99.6%) with a 1-min Apgar score of ≥ 8 and 2 newborns (0.4%) with a score of 4-7 (Tables 4 and 5).

Table 1 General data analysis of the two groups (mean $\pm$ SD, $n = 9240$)

Group	Cases	Age (yr)	Gestational age (d)	Gravidity (times)	Neonatal weight (g)
Observation	1076	29.33 $\pm$ 3.04	279.85 $\pm$ 7.01	1.43 $\pm$ 0.74	3329.73 $\pm$ 324.57
Control	8164	29.13 $\pm$ 3.45	277.59 $\pm$ 7.18	1.58 $\pm$ 0.88	3651.35 $\pm$ 337.62
<i>t</i>		1.847	9.727	-5.63	7.63

DISCUSSION

Analysis of risk factors for failed trial of labor

This study and related reports^[11-14] showed that the age of pregnant women was significantly associated with cesarean section. This study showed that the rate of conversion to cesarean section in trial of labor for elderly parturient women was 8.7%. The incidence of conversion to cesarean section in the labor process was 43.1% due to fetal distress, 12.1% due to malpresentation, 12.1% due to cephalopelvic disproportion, and 6.9% due to social factors. The gradual delay in childbearing age is a global problem, and the study by Rydahl *et al*^[12] shows that the proportion of women who have given birth at age 35 years or older has increased from 15% (1998) to 21% (2015). We believe that the fertility of older women is lower, the incidence of pregnancy complications is higher, the placental function and placental blood supply are relatively poor, and the incidence of fetal distress increases during labor. The physical strength, endurance, and muscle and skin elasticity of the elderly parturient are significantly decreased, the function of the myometrium may be impeded, and the difficulty of childbirth is increased. In the process of labor, abnormal conditions such as fetal extension and flexion may occur, and the incidence of malpresentation, cephalopelvic disproportion, and other indications for cesarean section may increase. The fetus of the elderly parturient is relatively precious. If the fetus is slightly abnormal during the labor process, the parturient and family members are willing to give up the trial of labor. This is the reason for an increase in the cesarean section rate caused by social factors.

Related studies^[15-17] showed that macrosomia was a risk factor for conversion to cesarean section in trial of labor, which was confirmed to be an independent risk factor in our study. Our data showed that the cesarean section conversion rate in the trial of parturient labor with macrosomia was 18.0%. During the labor process, 24.7% of the cesarean section conversion cases were due to fetal distress, 10.7% due to cephalopelvic disproportion, 9.3% due to social factors, and 8.0% due to malpresentation. In macrosomia, the degree of calcification of the fetal skull increases, which limits the plasticity of the fetal head and increases the risk of malpresentation in the trial of labor, such as cephalopelvic disproportion, persistent occipitoposterior position, and persistent occipitotransverse position. Most cases of macrosomia are accompanied by overdue pregnancy, placental function is relatively decreased, labor is relatively prolonged, and fetal distress is relatively increased. At the same time, the patient is worried about the risk of mother's lateral episiotomy, postpartum hemorrhage, newborn shoulder dystocia, clavicle fracture, *etc.*, directly abandoning the trial of labor, and increasing the cesarean section caused by social factors.

Our study found that the cesarean section rate of delayed pregnancy (≥ 41 wk) was higher than that of normal pregnancy, consistent with the results of Wang *et al*^[18] and Mya *et al*^[19]. Our study showed that the cesarean section conversion rate in the trial of labor of delayed pregnancy was 19.58%. Among those who converted to cesarean section in delayed pregnancy, 23.9% were due to fetal distress, 13.0% due to abnormal labor, 11.2% to social factors, and 5.1% to malpresentation. Smith *et al*^[20] believed that the effect of overdue pregnancy on maternal outcomes primarily lies in placental function and morphological changes. If the maternal placenta function is normal, the fetus is over-expanded, the risk of macrosomia increases, the labor process is prolonged, the active period is stagnant, and persistent occipitoposterior and occipitotransverse positions are a risk, leading to dystocia. Conversely, if maternal placental function is attenuated, the risk of intrauterine distress and even intrauterine fetal deaths increases. At this point, the solution is cesarean section.

Our study concluded that primiparity was an independent risk factor for cesarean section, consistent with the studies by Wang *et al*^[21] and Vaughan *et al*^[22]. Our data showed that the cesarean section conversion rate in the trial of labor in primiparas was 13.54%. The conversion was due to fetal distress in 33.5%, to social factors in 12.6%, to abnormal labor in 9.1%, and to malpresentation in 11.5%. The primipara may have an

Table 2 Comparison of basic data and labor management between the two groups

	Pregnancy outcome				χ^2	<i>P</i> value
	Control group (vaginal delivery)		Observation group (conversion to cesarean section)			
	Frequency	Percent	Frequency	Percent		
Age (yr)						
≤ 20	34	0.4	3	0.3	0.503	0.478
20-35	7523	92.2	1015	94.3		
≥ 35	607	7.4	58	5.4	6.005	0.014
Neonatal weight (g)						
< 2500	37	0.4	6	0.6	0.381	0.537
2500-4000	7444	91.2	920	85.5		
≥ 4000	683	8.4	150	13.9	36.186	0.000
Gestational age (wk)						
< 37	54	0.7	5	0.6	0.303	0.582
37-41	7298	89.4	874	88.2		
≥ 41	812	9.9	197	11.5	67.943	0.000
Use of uterine contraction drugs						
Yes	2578	31.6	447	44.3	42.873	0.000
No	5586	68.4	559	55.7		
Parity						
Primipara	6642	81.4	1040	96.7	158.695	0.000
Multipara	1522	18.6	36	3.3		
Fever during labor						
Yes	365	4.5	191	17.8	296.479	0.000
No	7799	95.5	885	82.2		
Labor analgesia						
Yes	3685	45.1	415	38.6	16.617	0.000
No	4479	54.9	661	61.4		
Scarred uterus						
Yes	23	0.3	5	0.5	1.053	0.305
No	8141	99.7	1071	99.5		
Abnormal amniotic fluid (meconium stained or bloody)						
Yes	2158	26.4	290	27	0.131	0.717
No	6006	73.6	786	73		
Prolonged labor/ active stage retention						
Yes	344	4.2	56	5.2	2.254	0.133
No	7820	95.8	1020	94.8		
Prolonged pregnancy						
Yes	7	0.1	1	0.1	0.006	0.94
No	8157	99.9	1075	99.9		

insufficient understanding of labor and labor pain. During the labor process, there are negative emotions such as fear, pain, anxiety, nervousness, depression, and decreased appetite, which may lead to uterine atony and abnormal labor. At the same time, most of the patients with negative emotions have hyperventilation and increased oxygen

Table 3 Multivariate logistic regression analysis of conversion to cesarean section in failed trial of labor

Factor	β	SE	Wald	P value	OR	95%CI	
						Lower limit	Upper limit
Age	-0.274	0.148	3.413	0.065	0.760	0.569	1.017
Gestational age	-0.619	0.090	47.055	0.000	0.538	0.451	0.642
Primipara	-2.036	0.179	129.417	0.000	0.131	0.092	0.185
Uterine contraction drugs	-0.324	0.070	21.557	0.000	0.723	0.631	0.829
Fever during birth	-1.426	0.100	203.684	0.000	0.240	0.198	0.292
Neonatal weight	-0.282	0.052	29.809	0.000	0.754	0.681	0.834
Labor analgesia	0.620	0.070	77.782	0.000	1.858	1.619	2.132

Table 4 Analysis of indications for conversion to cesarean section in failed trial of labor

Indication for conversion to cesarean section	Frequency	Constituent ratio (%)	Ordinal position
Fetal distress	477	44.3	1
Social factors	138	12.8	2
Malpresentation	101	9.4	3
Cephalopelvic disproportion	96	8.9	4
Prolonged labor/active stage retention	56	5.2	5
Chorioamnionitis	51	4.7	6
Macrosomia	48	4.5	7
Fever during labor	20	1.9	8
Placental abruption	16	1.5	9
Pregnancy complication	15	1.4	10
Oligohydramnios	14	1.3	11
Other	14	1.3	11
Premature rupture of membranes	10	0.9	12
Umbilical abnormality	10	0.9	12
Induction failure	5	0.5	13
Scarred uterus	5	0.5	13

consumption, so the fetal oxygen supply is relatively reduced, and the intrauterine distress is increased. Primiparity at an advanced age may lead pregnant women, their families, and their obstetrician doctors to subconsciously think that the fetus is extremely "precious", the labor process is slightly abnormal, and the requirements for cesarean section indications will be relaxed, increasing the incidence of cesarean section caused by social factors.

Our study found that fever during labor increased the cesarean section rate, consistent with related reports^[23,24]. Our study showed that fever in the labor process was due to fetal distress in 22.0% of cases, due to cephalopelvic disproportion in 11.0%, and due to malpresentation in 9.4%. Fever during labor can lead to an increase in maternal heart rate, a relative increase in fetal heart rate, and an increase in the incidence of fetal distress and misdiagnosis. At the same time, the labor process of patients with cephalopelvic disproportion and malpresentation increased relatively, the infection rate increased, and the incidence of fever increased; the two factors affected each other.

Our study showed that the cesarean section conversion rate in the labor induced by uterine contraction drugs was significantly higher than that of natural labor, and uterine contraction drug use was an independent risk factor for the conversion to cesarean section in the trial of labor. The conversion rate of cesarean section in the

Table 5 Analysis of indications for conversion to cesarean section in women with high risk factors for vaginal trial of labor failure, *n* (%)

	Advanced age (<i>n</i> = 58)	Gestational wk ≥ 41 (<i>n</i> = 197)	Primipara (<i>n</i> = 1040)	Uterine contraction drugs (<i>n</i> = 477)	Fever during labor (<i>n</i> = 191)	Macrosomia (<i>n</i> = 150)
Fetal distress	25 (43.1)	47 (23.9)	349 (33.5)	156 (32.7)	42 (22)	37 (24.7)
Social factors	4 (6.9)	22 (11.2)	131 (12.6)	59 (12.4)	13 (6.8)	14 (9.3)
Malpresentation	7 (12.1)	10 (5.1)	78 (7.5)	55 (11.5)	18 (9.4)	12 (8)
Cephalopelvic disproportion	6 (10.3)	9 (4.6)	95 (9.1)	44 (9.2)	21 (11)	16 (10.7)
Abnormal labor	4 (6.9)	13 (6.6)	39 (3.8)	27 (5.7)	10 (5.2)	8 (5.3)
Other	12 (20.7)	96 (48.8)	348 (33.5)	136 (28.5)	87 (45.6)	63 (42)

uterine contraction drug-induced trial of labor was 21.0%. Among them, fetal distress accounted for 32.7%, social factors accounted for 12.4%, malpresentation accounted for 11.5%, and cephalopelvic disproportion accounted for 9.2%. Kominiarek *et al*^[25] showed that the immature cervix required oxytocin to induce labor, and uterine inertia and slowed progress in labor were risk factors for cesarean section. Neal *et al*^[26] and Kauffman *et al*^[27] found that, in patients with natural labor, those with uterine openings less than 4 cm at admission had an increased risk of obstetric intervention, such as oxytocin, and an increased cesarean section rate. Induction of contractions and promotion of cervical ripening during labor may lead to excessive contractions, fetal distress, abnormal fetal position, *etc.*, leading to secondary uterine inertia. At the time of antenatal care, patients and their families who are willing to have a vaginal delivery should be referred for that indication at admission.

Indication analysis for cesarean section conversion in failed trial of labor

Natural childbirth itself is a complex dynamic process with many uncertainties. Cesarean section has many indications, including abnormalities in the labor process, birth canal, force of labor, and fetal and maternal factors; some indications are for the obstetric medical staff to make a diagnosis and give advice at the time of birth. Therefore, it is the duty of the obstetrician to strictly control the indications for cesarean section conversion in the failed trial of labor, to guide the mother to choose the correct mode of delivery and to improve the trial of labor success rate.

Our study shows that fetal distress and social factors, which are subjective, are the main indications for cesarean section. These indications for cesarean section have plasticity and may be effective indications for reducing cesarean section. Other indications include malpresentation, cephalopelvic disproportion leading to prolonged labor, and active stage retention.

The diagnosis of intrauterine distress in the fetus is mainly based on fetal movement, electronic fetal heart monitoring, and amniotic fluid status, but there is no uniform standard both in China and other countries. At present, the interpretation of fetal heart monitoring results is mostly judged by clinician experience; there are certain false positive and false negative rates, and some false positive results are very common. Heelan-Fancher *et al*^[28] showed an increased cesarean section rate and vaginal assistance rate in continuous electronic fetal heart monitoring applications. In the past, it was thought that intrauterine hypoxia caused an increase in intestinal peristalsis and anal sphincter relaxation, leading to amniotic fluid meconium staining; however, recent studies have shown that vagus nerve stimulation caused by fetal maturation, umbilical cord compression, and other factors will also make the amniotic fluid turbid. Therefore, the traits of the amniotic fluid cannot be used as an independent indication for the conversion to cesarean section based on the diagnosis of intrauterine distress. Continuous electronic fetal heart monitoring will cause the mother to pay too much attention to the fetal heart rate, reduce the accuracy of fetal movement counting, and increase the anxiety during birth; the mother will gradually lose confidence in the possibility of a vaginal delivery. We suggest that fetal heart monitoring can be intermittently performed during the labor process, and comprehensive evaluation of the characteristics of amniotic fluid and the maternal count of fetal movement can be used to reduce the diagnosis of intrauterine distress due to self-protection of the doctor. The pros and cons should be comprehensively analyzed to reduce the cesarean section rate. At the same time, because the fetus of

older patients is relatively precious, clinicians will slightly relax the diagnostic indications for fetal distress. Therefore, the incidence of intrauterine distress is increased.

Cesarean section caused by social factors refers to cesarean sections without clear surgical indications and cesarean sections performed at the request of the pregnant women and their families. The main reason for cesarean section caused by social factors without trial of labor is the misunderstanding of vaginal delivery in patients. They fear labor pain, believe that vaginal delivery will affect the beauty of their body, and are concerned that vaginal relaxation may affect their sexual activity. They also believe that, with current improved medical conditions, cesarean section is safer for mothers and babies. Some mothers and family members are superstitious about the "birth time" and require cesarean section. In today's medical environment, medical staff may also relax cesarean section indications. The main reason for cesarean section caused by social factors in the trial of labor is the patient leading a life without hardship. Paroxysmal uterine contractions during the trial of labor make it intolerable for the patients, and they become anxious and fearful; patients often lack of a sufficient understanding of the labor process, which makes them lose the courage to continue the trial of labor, and negative emotions are conveyed to the family. When even the slightest abnormality appears in the labor process or with the fetus, the patient and their families are willing to give up the trial. Mothers and their family members have the right to informed consent. After the doctor fully informs the patients, those who insist on cesarean section cannot be forced to continue the trial of labor. Outpatient medical examination doctors in our hospital guide patients to control their weight, closely monitor blood pressure, blood sugar, *etc.*, and encourage patients and their families to participate in maternity schools to master pregnancy and childbirth-related knowledge, such as maternity exercises, breathing exercises, muscle relaxation, and accompanying delivery skills. Before the birth, doctors fully inform the admitted patients about the vaginal delivery process, the abnormal conditions that may occur, and the related treatment measures, increasing maternal confidence in vaginal delivery. Our study showed that painless delivery is a successful protective factor for vaginal delivery, and that analgesia is delivered to patients who cannot tolerate labor pain.

When the patient feels posterior vaginal emptiness, anal tenesmus, *etc.*, the medical staff should check the actual situation of the patient, observe whether there is cephalopelvic disproportion, malpresentation, or other abnormalities. Active and timely treatment may effectively reduce the cesarean section conversion rate in the trial of labor.

In summary, the conversion to emergency cesarean section in failed trial of labor is related to a variety of factors. Obstetricians should explain the related knowledge comprehensively, carefully conduct prenatal examination, and patiently guide and encourage the mother during the labor process. Doctors should be familiar with the indications for cesarean section, improve the judgment accuracy of the indications for cesarean section, ensure the rationality of cesarean section conversion in vaginal delivery, reduce the cesarean section rate and the trial of labor failure rate, and improve the quality of delivery.

China has 56 nationalities, with more than 1.4 billion people, and is the world's most populous country. People from different ethnic groups and regions have different ideas on the number of children and delivery methods. This data is from the only one hospital, which cannot effectively represent the phenomenon of China. We have a contingent of top-notch researchers that are still counting the follow-up data. Meanwhile, we will apply for relevant research project funding in the future, and strive for more data by combining with hospitals in different regions and ethnic groups.

ARTICLE HIGHLIGHTS

Research background

After China's two-child policy was fully liberalized, the country officially entered the "universal two-children" era, and the obstetrics industry faced enormous challenges brought about by the birth peak. Vaginal delivery is the ideal mode of delivery for the termination of a pregnancy. The cesarean section rate in China is much higher than the published by the World Health Organization in the *Lancet* in 2010.

Research motivation

The motivation of this research was to explore how to promote the trial of labor success rate, and determine the feasibility of reducing the rate of conversion to cesarean section.

Research objectives

The research objectives were to summarize the related factors of the failed vaginal delivery, and to propose reasonable prevention and resolution strategies to increase the trial of labor success rate.

Research methods

A retrospective analysis was performed on 9240 maternal women who met vaginal delivery conditions and required a trial of labor from January 2016 to December 2018 at our hospital. Among them, 8164 pregnant women who had a successful trial of labor were used as a control group, and 1076 pregnant women who had a failed trial of labor and converted to an emergency cesarean section were used as an observation group. The patients' clinical data during hospitalization were collected for comparative analysis, the related factors of the failed trial of labor were discussed, and reasonable prevention and resolution strategies were proposed to increase the trial of labor success rate.

Research results

The analysis revealed that advanced age, macrosomia, delayed pregnancy, use of uterine contraction drugs, primipara, and fever during labor were associated with conversion to emergency cesarean section in failed trial of labor. Multivariate regression analysis showed that age, gestational age, primipara, use of uterine contraction drug, fever during birth, and newborn weight led to a higher probability of conversion to an emergency cesarean section in the failed trial of labor.

Research conclusions

The conversion to emergency cesarean section in failed trial of labor is affected by many factors.

Research perspectives

The authors will still count the follow-up data and apply for relevant research project funding in the future, and strive for more data by combining with hospitals in different regions and ethnic groups.

REFERENCES

- 1 Xia X, Zhou Z, Shen S, Lu J, Zhang L, Huang P, Yu J, Yang L, Wang P, Lam KH, Jacobsson B, Mol BW, Xia H, Qiu X. Effect of a two-stage intervention package on the cesarean section rate in Guangzhou, China: A before-and-after study. *PLoS Med* 2019; **16**: e1002846 [PMID: 31283770 DOI: 10.1371/journal.pmed.1002846]
- 2 Blustein J, Liu J. Time to consider the risks of caesarean delivery for long term child health. *BMJ* 2015; **350**: h2410 [PMID: 26063685 DOI: 10.1136/bmj.h2410]
- 3 Zhao Y, Zhang J, Zamora J, Vogel JP, Souza JP, Jayaratne K, Ganchimeg T, Ortiz-Panozo E, Hernandez B, Oladapo OT, Torloni MR, Morisaki N, Mori R, Pileggi-Castro C, Tunçalp Ö, Shen X, Betrán AP. Increases in Caesarean Delivery Rates and Change of Perinatal Outcomes in Low- and Middle-Income Countries: A Hospital-Level Analysis of Two WHO Surveys. *Paediatr Perinat Epidemiol* 2017; **31**: 251-262 [PMID: 28474743 DOI: 10.1111/ppe.12363]
- 4 Hou L, Li GH, Zou LY, Li CD, Chen Y, Ruan Y, Wang X, Jia CX, Zhang WY. Cesarean delivery rate and indications in mainland China: a cross sectional study in 2011. *Zhonghua Fuchanke Zazhi* 2014; **4**: 728-735 [DOI: 10.3760/cma.j.issn.0529-567x.2014.10.003]
- 5 Keag OE, Norman JE, Stock SJ. Long-term risks and benefits associated with cesarean delivery for mother, baby, and subsequent pregnancies: Systematic review and meta-analysis. *PLoS Med* 2018; **15**: e1002494 [PMID: 29360829 DOI: 10.1371/journal.pmed.1002494]
- 6 Rutayisire E, Wu X, Huang K, Tao S, Chen Y, Tao F. Cesarean section may increase the risk of both overweight and obesity in preschool children. *BMC Pregnancy Childbirth* 2016; **16**: 338 [PMID: 27809806 DOI: 10.1186/s12884-016-1131-5]
- 7 Solheim KN, Esakoff TF, Little SE, Cheng YW, Sparks TN, Caughey AB. The effect of cesarean delivery rates on the future incidence of placenta previa, placenta accreta, and maternal mortality. *J Matern Fetal Neonatal Med* 2011; **24**: 1341-1346 [PMID: 21381881 DOI: 10.3109/14767058.2011.553695]
- 8 Xu C, Fu Q, Tao HB, Lin XJ, Wang ML, Xia SX, Xiong HL. Effect of Cesarean Section on the Severity of Postpartum Hemorrhage in Chinese Women: The Shanxi Study. *Curr Med Sci* 2018; **38**: 618-625 [PMID: 30128870 DOI: 10.1007/s11596-018-1922-1]

- 9 **Lin XH**, Niu JM, Liang ZJ. Analysis of the indication and influence factors of cesarean section in past 10 years. *Zhongguo Fuyou Baojian* 2012; **27**: 657-659
- 10 **Chen YM**. The Risk Factors Associated with Failure of Vaginal Delivery. M.Sc. Thesis, Zhejiang University. 2015; Available from: <http://cdmd.cnki.com.cn/Article/CDMD-10335-1015614954.htm>
- 11 **Zhao MH**. Postponement of Childbearing and Recent Trends of Fertility in China. *Ren Kou Xue Kan* 2016; **38**: 14-25 [DOI: [10.16405/j.cnki.1004-129X.2016.01.002](https://doi.org/10.16405/j.cnki.1004-129X.2016.01.002)]
- 12 **Rydahl E**, Declercq E, Juhl M, Maimburg RD. Cesarean section on a rise-Does advanced maternal age explain the increase? A population register-based study. *PLoS One* 2019; **14**: e0210655 [PMID: [30677047](https://pubmed.ncbi.nlm.nih.gov/30677047/) DOI: [10.1371/journal.pone.0210655](https://doi.org/10.1371/journal.pone.0210655)]
- 13 **Wu CH**, Chen CF, Chien CC. Prediction of dystocia-related cesarean section risk in uncomplicated Taiwanese nulliparas at term. *Arch Gynecol Obstet* 2013; **288**: 1027-1033 [PMID: [23636412](https://pubmed.ncbi.nlm.nih.gov/23636412/) DOI: [10.1007/s00404-013-2864-2](https://doi.org/10.1007/s00404-013-2864-2)]
- 14 **Richards MK**, Flanagan MR, Littman AJ, Burke AK, Callegari LS. Primary cesarean section and adverse delivery outcomes among women of very advanced maternal age. *J Perinatol* 2016; **36**: 272-277 [PMID: [26741572](https://pubmed.ncbi.nlm.nih.gov/26741572/) DOI: [10.1038/jp.2015.204](https://doi.org/10.1038/jp.2015.204)]
- 15 **Wan L**, Zhu P, Pan XF. Research progress of macrosomia on maternal and child health. *Zhongguo Jihua Shengyu He Fuchanke* 2018; **10**: 33-37 [DOI: [10.3969/j.issn.1674-4020.2018.05.08](https://doi.org/10.3969/j.issn.1674-4020.2018.05.08)]
- 16 **Liu KC**, Joseph JA, Nkole TB, Kaunda E, Stringer JS, Chi BH, Stringer EM. Predictors and pregnancy outcomes associated with a newborn birth weight of 4000 g or more in Lusaka, Zambia. *Int J Gynaecol Obstet* 2013; **122**: 150-155 [PMID: [23669164](https://pubmed.ncbi.nlm.nih.gov/23669164/) DOI: [10.1016/j.ijgo.2013.03.010](https://doi.org/10.1016/j.ijgo.2013.03.010)]
- 17 **Li XQ**, Xu XG, Wang HJ, Ren ZH. Study on the impact of macrosomia on their mothers and themselves around childbirth. *Zhongguo Shengyu Jiankang Zazhi* 2019; **30**: 121-126 [DOI: [10.3969/j.issn.1671-878X.2019.02.005](https://doi.org/10.3969/j.issn.1671-878X.2019.02.005)]
- 18 **Wang XS**. The effect of opportunity of pregnancy termination and delivery mode on maternal and infant outcomes of pregnant women with expired pregnancy. *Zhongguo Jihua Shengyuxue Zazhi* 2018; **26**: 1077-1081 [DOI: [10.3969/j.issn.1004-8189.2018.11.016](https://doi.org/10.3969/j.issn.1004-8189.2018.11.016)]
- 19 **Mya KS**, Laopaiboon M, Vogel JP, Cecatti JG, Souza JP, Gulmezoglu AM, Ortiz-Panozo E, Mittal S, Lumbiganon P; WHO multi-country survey on maternal and newborn health research network. Management of pregnancy at and beyond 41 completed weeks of gestation in low-risk women: a secondary analysis of two WHO multi-country surveys on maternal and newborn health. *Reprod Health* 2017; **14**: 141 [PMID: [29084551](https://pubmed.ncbi.nlm.nih.gov/29084551/) DOI: [10.1186/s12978-017-0394-2](https://doi.org/10.1186/s12978-017-0394-2)]
- 20 **Smith GC**, Cordeaux Y, White IR, Pasupathy D, Missfelder-Lobos H, Pell JP, Charnock-Jones DS, Fleming M. The effect of delaying childbirth on primary cesarean section rates. *PLoS Med* 2008; **5**: e144 [PMID: [18597550](https://pubmed.ncbi.nlm.nih.gov/18597550/) DOI: [10.1371/journal.pmed.0050144](https://doi.org/10.1371/journal.pmed.0050144)]
- 21 **Wang Q**, Wang HL. Changes in cesarean section rate, pregnancy outcome and indications for cesarean section in 2014-2016. *Zhongguo Fuyou Baojian* 2017; **32**: 2193-2195 [DOI: [10.7620/zgfybj.j.issn.1001-4411.2017.10.52](https://doi.org/10.7620/zgfybj.j.issn.1001-4411.2017.10.52)]
- 22 **Vaughan DA**, Cleary BJ, Murphy DJ. Delivery outcomes for nulliparous women at the extremes of maternal age - a cohort study. *BJOG* 2014; **121**: 261-268 [PMID: [23755916](https://pubmed.ncbi.nlm.nih.gov/23755916/) DOI: [10.1111/1471-0528.12311](https://doi.org/10.1111/1471-0528.12311)]
- 23 **Zhang CQ**, Lu CQ, Qian BQ, Wang JM. Analysis of the risk factors for neonatal infection with intrapartum maternal fever. *Zhongguo Xunzheng Erke Zazhi* 2018; **13**: 438-441 [DOI: [10.3969/j.issn.1673-5501.2018.06.008](https://doi.org/10.3969/j.issn.1673-5501.2018.06.008)]
- 24 **Bensal A**, Weintraub AY, Levy A, Holcberg G, Sheiner E. The significance of peripartum fever in women undergoing vaginal deliveries. *Am J Perinatol* 2008; **25**: 567-572 [PMID: [18756433](https://pubmed.ncbi.nlm.nih.gov/18756433/) DOI: [10.1055/s-0028-1085624](https://doi.org/10.1055/s-0028-1085624)]
- 25 **Kominiarek MA**, VanVeldhuisen P, Gregory K, Fridman M, Kim H, Hibbard JU. Intrapartum cesarean delivery in nulliparas: risk factors compared by two analytical approaches. *J Perinatol* 2015; **35**: 167-172 [PMID: [25254334](https://pubmed.ncbi.nlm.nih.gov/25254334/) DOI: [10.1038/jp.2014.179](https://doi.org/10.1038/jp.2014.179)]
- 26 **Neal JL**, Lamp JM, Buck JS, Lowe NK, Gillespie SL, Ryan SL. Outcomes of nulliparous women with spontaneous labor onset admitted to hospitals in preactive versus active labor. *J Midwifery Womens Health* 2014; **59**: 28-34 [PMID: [24512265](https://pubmed.ncbi.nlm.nih.gov/24512265/) DOI: [10.1111/jmwh.12160](https://doi.org/10.1111/jmwh.12160)]
- 27 **Kauffman E**, Souter VL, Katon JG, Sitecov K. Cervical Dilation on Admission in Term Spontaneous Labor and Maternal and Newborn Outcomes. *Obstet Gynecol* 2016; **127**: 481-488 [PMID: [26855106](https://pubmed.ncbi.nlm.nih.gov/26855106/) DOI: [10.1097/AOG.0000000000001294](https://doi.org/10.1097/AOG.0000000000001294)]
- 28 **Heelan-Fancher L**, Shi L, Zhang Y, Cai Y, Nawai A, Leveille S. Impact of continuous electronic fetal monitoring on birth outcomes in low-risk pregnancies. *Birth* 2019; **46**: 311-317 [PMID: [30811649](https://pubmed.ncbi.nlm.nih.gov/30811649/) DOI: [10.1111/birt.12422](https://doi.org/10.1111/birt.12422)]



Published by **Baishideng Publishing Group Inc**
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

Telephone: +1-925-3991568

E-mail: bpgoffice@wjgnet.com

Help Desk: <https://www.f6publishing.com/helpdesk>

<https://www.wjgnet.com>

