Vol. 5 No. 1 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

The study of Labor Induction in cases of Severe Reduction of Amniotic Fluid in the Obstetrics and Gynecology Department of Abu Ali Sina Regional Educational Hospital in Balkh

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Keywords: Severe Reduction of Amniotic Fluid, Labor Induction, Oxytocin, Maternal and Fetal Health, Vaginal Delivery.

Received on 25 Feb 2026
Accepted on 01 Mar 2026
Published on 08 Mar 2026

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Abstract

Severe reduction of amniotic fluid is a high-risk condition during pregnancy that can directly threaten the health of both mother and fetus. It is associated with outcomes such as intrauterine growth restriction, fetal hypoxia, mechanical pressure on the fetus, and an increased risk of intrauterine death. Labor induction in such cases, particularly with the use of oxytocin and careful monitoring of the mother and fetus, is considered one of the most important clinical interventions to reduce maternal and fetal complications.

This study was conducted in a library-analytical manner, reviewing data from 40 patients visiting the obstetrics and gynecology department of Abu Ali Sina Regional Educational Hospital in Balkh to evaluate the effects of labor induction in cases of severe oligohydramnios. The results indicated that from the 40 patients, 26 (65%) experienced severe reduction, while 14 (35%) had very severe reduction of amniotic fluid. All patients underwent labor induction with oxytocin, with an average induction timing of 37 weeks reported. In terms of birth outcomes, 28 patients (70%) had successful vaginal deliveries, while 12 (30%) required cesarean sections. Additionally, 4 newborns (10%) were born with low Apgar scores (<7).

Analysis of the relationship between the severity of amniotic fluid reduction and type of delivery and low Apgar scores showed no statistically significant correlation, indicating the possibility of effective management even in very severe cases. The findings suggest that the success of labor induction depends on various factors, including appropriate timing, selection of clinical methods, and careful monitoring of both mother and fetus, with non-compliance potentially increasing maternal and fetal complications. This study highlights the importance of formulating standard clinical protocols, training healthcare staff, and continuous monitoring of mothers and fetuses, which can play a vital role in improving birth outcomes and reducing complications in cases of severe oligohydramnios.

Introduction

Severe reduction of amniotic fluid is a high-risk condition during pregnancy that can seriously threaten the health of both the mother and fetus. This condition is typically

defined by an Amniotic Fluid Index of less than 5 centimeters or a Single Deepest Pocket of less than 2 centimeters, and it is associated with outcomes such as intrauterine growth restriction, fetal hypoxia, mechanical pressure on the fetus, and an increased risk of intrauterine death (Cunningham et al., 2022).

Labor induction in cases of severe oligohydramnios is one of the most critical clinical interventions aimed at reducing maternal and fetal risks. Severe oligohydramnios, defined by an Amniotic Fluid Index of less than 5 centimeters or a depth of a single pocket of less than 2 centimeters, can lead to significant repercussions, including intrauterine growth restriction, placental dysfunction, fetal hypoxia, and increased intrauterine mortality (Nasrollahi, etal, 2021).

From an epidemiological perspective, severe oligohydramnios occurs in approximately 0.5% to 1% of pregnancies. However, in countries with limited prenatal care, the prevalence and severity of outcomes are often greater. Studies indicate that reduced amniotic fluid can lead to mechanical pressure on the fetus, decreased fetal movement, and an elevated risk of respiratory and cardiovascular complications in newborns (WHO, 2018).

Labor induction aimed at safely concluding pregnancies in cases of severe oligohydramnios is of utmost importance. Induction methods include the use of prostaglandins, oxytocin, and mechanical devices such as cervical balloons, which are selected based on the status of the mother and fetus, gestational age, and cervical readiness. The goal of these interventions is to reduce the risk of fetal mortality, prevent hypoxia, and mitigate complications associated with insufficient amniotic fluid(Javadian, etal, 2011).

Recent studies indicate that continuous monitoring of fetal heart rate, uterine contractions, and preparation of the healthcare team play a key role in the success of labor induction and in reducing complications arising from severe oligohydramnios(Razmi-Reza, 2017).

Given the clinical significance of severe oligohydramnios and the vital role of labor induction in mitigating maternal and fetal risks, conducting scientific and library-based studies on this topic in clinical settings like the obstetrics and gynecology department of Abu Ali Sina Regional Educational Hospital in Balkh can contribute to improving care quality, formulating management protocols, and increasing awareness among healthcare personnel.

Problem Statement

Severe reduction of amniotic fluid is one of the significant and high-risk issues during pregnancy that can directly threaten the health of both the mother and fetus. This condition is typically defined by an Amniotic Fluid Index of less than 5 centimeters or a single deepest pocket depth of less than 2 centimeters and is associated with consequences such as intrauterine growth restriction, fetal hypoxia, mechanical pressure on the fetus, and an increased risk of intrauterine death (Cunningham et al., 2022).

In such situations, making decisions regarding the timing and method of delivery is crucial. Labor induction is considered a clinical intervention aimed at reducing maternal and fetal complications. However, selecting the appropriate method for induction, continuous monitoring of fetal heart rate and uterine contractions, and managing potential complications require precise knowledge and the application of valid scientific protocols.

Despite the clinical importance, comprehensive and coherent library-based research on labor induction methods in cases of severe oligohydramnios has been limited, often presented as experiential studies or case reports. This lack of coherent scientific knowledge can lead to inappropriate clinical decisions and increased negative outcomes for both mother and fetus. Therefore, a systematic review and analysis of international and domestic scientific resources regarding labor induction in cases of severe

oligohydramnios in clinical settings like the obstetrics and gynecology department of Abu Ali Sina Regional Educational Hospital in Balkh seem essential.

Importance of the Research

Severe reduction of amniotic fluid is a high-risk condition during pregnancy that can have serious consequences for both the mother and fetus, including intrauterine growth restriction, hypoxia, cardiopulmonary insufficiency, and increased intrauterine mortality. The scientific investigation and analysis of labor induction methods in such circumstances are particularly important, as the appropriate method choice, precise timing, and continuous monitoring can minimize maternal and fetal complications and enhance the quality of prenatal care.

Moreover, conducting this library-based research can play a crucial role in the education and empowerment of healthcare personnel. By collecting and analyzing reputable scientific resources, appropriate management protocols can be developed for clinical environments such as the obstetrics and gynecology department of Abu Ali Sina Regional Educational Hospital in Balkh, leading to evidence-based clinical decision-making. Additionally, enhancing the scientific awareness of healthcare providers and pregnant women can help reduce the need for unnecessary interventions and decrease complications and mortality rates for both mother and fetus.

Research Objectives

Primary Objective:

To conduct a comprehensive and systematic review of labor induction methods in cases of severe reduction of amniotic fluid, aimed at improving maternal and fetal care quality and reducing associated complications in clinical settings such as the obstetrics and gynecology department of Abu Ali Sina Regional Educational Hospital in Balkh.

Secondary Objectives:

1. Identify the causes and risk factors associated with the occurrence of severe oligohydramnios and its maternal and fetal outcomes.
2. Examine various labor induction methods, necessary timing, and monitoring to reduce maternal and fetal complications.
3. Analyze preventive solutions, management, and training for healthcare personnel to enhance care quality and reduce maternal and neonatal mortality.

Research Hypotheses

Main Hypothesis:

Timely labor induction and proper management in cases of severe reduction of amniotic fluid will lead to reduced maternal and fetal complications and improved delivery outcomes.

Secondary Hypotheses:

- Continuous monitoring and the selection of appropriate labor induction methods will decrease the rates of maternal and fetal mortality.
- Identifying risk factors and educating mothers and healthcare personnel will reduce complications associated with severe oligohydramnios.
- Adherence to scientific and international guidelines in managing deliveries in such conditions will improve care quality and clinical outcomes.

Research Methodology

This research is of an applied-descriptive type designed to scientifically and clinically examine labor induction in severe oligohydramnios conditions. In this method, information was collected from reputable scientific sources, published research articles, specialized books, and international guidelines to provide a comprehensive and systematic perspective on the topic.

In addition to reviewing literature, clinical data from 40 patients visiting the obstetrics and gynecology department of Abu Ali Sina Regional Educational Hospital in Balkh were extracted from patient files. The collected data included risk factors, pregnancy history, maternal age, labor induction methods, fetal and maternal monitoring, and delivery outcomes. After collection, the data were analyzed using descriptive-analytical methods to identify the relationship between risk factors and clinical outcomes and to provide applicable results for enhancing maternal and fetal care quality.

Theoretical Framework and Literature

Severe reduction of amniotic fluid is a significant pregnancy disorder associated with excessively low levels of amniotic fluid, which threatens the health of both the fetus and the mother. Amniotic fluid plays a vital role in providing physical and metabolic support to the fetus, regulating temperature, promoting lung development, and protecting against mechanical injuries. Disruption in amniotic fluid volume can lead to pressure on the placenta, impaired fetal blood flow, fetal anomalies, and increased risk of neonatal mortality (Cunningham et al., 2022).

From a clinical perspective, severe reduction of amniotic fluid is often caused by placental dysfunction, premature rupture of membranes, hypertension, renal disorders, or congenital defects in the fetus. These conditions can exert pressure on the fetus, reduce oxygen supply, and increase the risk of fetal distress, necessitating careful monitoring and immediate management, including labor induction or the prompt termination of pregnancy (American College of Obstetricians and Gynecologists, 2020).

Literature

International studies indicate that labor induction in cases of severe oligohydramnios plays a crucial role in reducing maternal and fetal complications. For example, Ananth and Keyes (2016) conducted a systematic review examining the relationship between reduced amniotic fluid and adverse neonatal outcomes, emphasizing the need for early intervention. They highlighted that timely management and the selection of appropriate labor induction methods could mitigate the risks of maternal and neonatal mortality(Anant & Keyes, 2016).

Other studies indicate that continuous monitoring of fetal status, the use of ultrasound, and assessment of maternal health indicators are among the key factors for successful management of this condition. Additionally, reports from the World Health Organization indicate that in developing countries, inadequate prenatal care and insufficient monitoring contribute to the increased complications associated with severe oligohydramnios(Mirzaei, etal, 2016).

In clinical settings such as the obstetrics and gynecology department of Abu Ali Sina Regional Educational Hospital in Balkh, real data analysis has shown that timely selection of labor induction methods and careful monitoring of mothers and fetuses can significantly impact reducing delivery complications, decreasing emergency cesarean section rates, and improving newborn health. However, comprehensive library-based studies in this area are limited, highlighting the need for systematic collection and analysis of international scientific resources.

Analysis

Table 1: Demographic Characteristics of Patients

Feature	Minimum	Maximum	Mean	Standard Deviation
Maternal Age (years)	25	35	30.1	3.0
Number of Pregnancies	1	4	2.3	0.9
Number of Previous Births	0	3	1.2	0.8

Table 1 shows the demographic characteristics of the 40 patients included in the study. The mean maternal age is 30.1 years with a standard deviation of 3.0 years, indicating a range from 25 to 35 years. This suggests that most mothers are within a mature and suitable age range for pregnancy, with relatively little age dispersion in the sample.
The average number of pregnancies is 2.3 with a standard deviation of 0.9, and the average number of previous births is 1.2 with a standard deviation of 0.8. These data indicate that most mothers have experienced at least one pregnancy and birth, while some have no previous birth experiences, and others have had up to three births. This diversity in pregnancy and birth histories may better reflect the influence of individual and clinical factors on delivery outcomes and provides a suitable foundation for analyzing the effects of labor induction in cases of severe oligohydramnios.

Table 2: Clinical Characteristics and Labor Induction Methods

Feature	Number of Patients	Percentage
Severity of Amniotic Fluid Reduction		
- Severe	26	65%
- Very Severe	14	35%
Labor Induction Method		
- Oxytocin	40	100%
Timing of Induction (weeks of pregnancy)		
- Mean	37	
- Minimum and Maximum	36 - 38	

Table 2 illustrates the clinical characteristics of the patients and the methods used for labor induction. Among the 40 patients, 26 (65%) presented with severe reduction of amniotic fluid, while 14 (35%) had very severe cases. This indicates that the majority of patients faced significant amniotic fluid reduction.
All patients underwent labor induction with oxytocin, and the mean timing of induction was 37 weeks, with a range from 36 to 38 weeks of gestation. These data reflect a consistent use of oxytocin as the primary labor induction method, initiated in late weeks of 36 to 38 of pregnancy. This timing and method selection aligns with established clinical standards aimed at minimizing maternal and neonatal complications and increasing the likelihood of natural delivery.

Table 3: Delivery Outcomes After Induction

Outcome	Number of Patients	Percentage
Natural Delivery	28	70%
Cesarean Section	12	30%
Postpartum Hemorrhage	5	12.5%
Decreased Fetal Movements Post-Induction	3	7.5%
Newborns with Low Apgar (<7)	4	10%

Table 3 presents the clinical delivery outcomes following induction. Of the 40 patients, 28 (70%) achieved natural deliveries, while 12 (30%) required cesarean sections. This statistic indicates that labor induction with oxytocin in cases of severe oligohydramnios significantly facilitates natural delivery, with only a small percentage of patients needing surgical intervention.
In addition to delivery type, maternal and fetal complications were also analyzed. Postpartum hemorrhage occurred in 5 patients (12.5%), and decreased fetal movements were reported in 3 patients (7.5%). Moreover, 4 newborns (10%) were born with low Apgar scores (<7), indicative of some potential adverse fetal outcomes. These findings underscore the importance of thorough monitoring of both the mother and fetus before and during labor induction to reduce complications and enhance delivery outcomes.

Table 4: Relationship Between the Severity of Amniotic Fluid Reduction and Delivery Type

Severity of Amniotic Reduction	Natural Delivery	Cesarean Section	Total
Severe	20	6	26
Very Severe	8	6	14
Total	28	12	40

Table 4 illustrates the relationship between the severity of amniotic fluid reduction and the type of delivery. Among patients with severe amniotic fluid reduction, 20 (77%) had natural deliveries and 6 (23%) underwent cesarean sections. In contrast, among those with very severe reductions, 8 (57%) achieved natural deliveries and 6 (43%) required cesarean sections.

These results indicate that as the severity of amniotic fluid reduction increases, the percentage of natural deliveries decreases, and the rate of cesarean sections rises. However, given the small sample size, statistical tests indicated no significant differences. Nevertheless, it can be said that the severity of oligohydramnios may serve as an important factor in choosing delivery methods and predicting the need for cesarean sections, highlighting the essential role of diligent monitoring for improving outcomes.

Table 5: Relationship Between the Severity of Amniotic Fluid Reduction and Low Apgar Scores

Severity of Amniotic Reduction	Apgar <7	Apgar ≥7	Total
Severe	2	24	26
Very Severe	2	12	14
Total	4	36	40

Table 5 demonstrates the relationship between the severity of amniotic fluid reduction and the Apgar score status of the newborns. Among patients with severe oligohydramnios, 2 newborns (7.7%) had Apgar scores below 7, while 24 newborns (92.3%) scored ≥7. Similarly, in the very severe group, 2 newborns (14.3%) had low Apgar scores, and 12 (85.7%) scored ≥7.

These data suggest that as the severity of amniotic fluid reduction increases, the proportion of newborns with low Apgar scores slightly rises; however, the overall number of newborns with low scores remains limited (4 out of 40; 10%). Thus, while very severe oligohydramnios may pose a slight risk for initial newborn status, appropriate interventions and careful monitoring can yield satisfactory outcomes for the majority of newborns.

Table 6: Comparison of Mean Induction Timing Between Natural Delivery and Cesarean Section Patients

Delivery Group	Mean Week	Standard Deviation	n
Natural	36.9	0.7	28
Cesarean	37.2	0.6	12

Table 6 compares the mean induction timing between patients with natural deliveries and cesarean sections. The mean induction timing in the natural delivery group is 36.9 weeks with a standard deviation of 0.7, whereas the cesarean section group has a mean of 37.2 weeks with a standard deviation of 0.6.

These results indicate that the differences in mean induction timing between the two groups are minor and not clinically significant. Therefore, the timing of labor induction does not seem to have a substantial impact on the type of delivery (whether natural or

cesarean). Other factors, such as the severity of amniotic fluid reduction, maternal and fetal status, and clinical management, may play more significant roles in determining the type of delivery.

Results

The findings of the study revealed that among 40 patients visiting the obstetrics and gynecology department of Abu Ali Sina Regional Educational Hospital in Balkh, the mean age of mothers was 30.1 ± 3.0years, with an average of 2.3 ± 0.9deliveries and 1.2 ± 0.8previous births. In terms of the severity of amniotic fluid reduction, 26 patients (65%) experienced severe oligohydramnios, while 14 patients (35%) had very severe cases. All patients underwent labor induction with oxytocin, with an average induction timing of 37 weeks (ranging from 36 to 38 weeks).

The analysis of delivery outcomes demonstrated that 28 patients (70%) achieved natural deliveries, while 12 patients (30%) required cesarean sections. Postpartum hemorrhage occurred in 5 patients (12.5%), and decreased fetal movements post-induction were observed in 3 patients (7.5%). Additionally, 4 newborns (10%) were born with low Apgar scores (<7).

Analysis of the relationship between the severity of amniotic fluid reduction and the type of delivery showed that in the severe group, 20 patients had natural deliveries and 6 required cesarean sections, whereas in the very severe group, 8 had natural deliveries and 6 required cesarean sections. The chi-squared test revealed no statistically significant difference between the severity of fluid reduction and the type of delivery.

Overall, the results indicate that the severity of amniotic fluid reduction does not have a statistically significant relationship with the type of delivery or low Apgar scores of the newborns. Labor induction with oxytocin, when combined with careful monitoring of the mother and fetus, can lead to a high rate of natural deliveries and favorable outcomes for newborns in cases of severe oligohydramnios.

Discussion

The findings of this study indicate that labor induction in cases of severe amniotic fluid reduction can yield favorable outcomes for both the mother and fetus, especially when accurate monitoring of fetal heart rate, uterine contractions, and proper preparation of the healthcare team are implemented. According to the results presented in the tables, 70% of patients achieved natural deliveries after induction, with only 30% requiring cesarean sections, underscoring the effectiveness of induction methods in clinical settings. This outcome aligns with the results of Cunningham et al. (2022) and recommendations from ACOG (2020), which emphasize the importance of selecting appropriate induction methods and maintaining continuous monitoring.

On the other hand, the relative rate of newborns with low Apgar scores (<7) was approximately 10%, indicating that even with the use of standard methods, severe amniotic fluid reduction can lead to adverse outcomes for the fetus. This finding is consistent with studies by Ananth and Keyes (2016), which associate reduced amniotic fluid with an increased risk of fetal distress and the need for emergency interventions.

Furthermore, it was observed that patients with very severe reductions in amniotic fluid had a higher likelihood of cesarean sections and low Apgar scores compared to those with severe reductions. This result suggests that the severity of oligohydramnios serves as an important predictive factor for the success of labor induction, as reported by RCOG (2019) and WHO (2018).

Overall, the results of the study emphasize that the success of labor induction in cases of severe oligohydramnios is dependent on various factors, including appropriate timing, selection of clinical methods, continuous monitoring, and the experience of the healthcare team. Neglecting these factors could increase maternal and fetal

complications. These findings highlight the importance of developing precise clinical protocols and providing ongoing training for healthcare personnel.

Conclusion

The current study demonstrated that labor induction using oxytocin in patients with severe amniotic fluid reduction at the obstetrics and gynecology department of Abu Ali Sina Regional Educational Hospital in Balkh can lead to favorable outcomes, provided that the mother and fetus are monitored closely. The results indicate that the majority of patients (70%) achieved successful natural deliveries, with only a small percentage requiring cesarean sections. Additionally, the limited number of newborns with low Apgar scores (<7) suggests that timely interventions and continuous monitoring play a critical role in reducing maternal and fetal complications.

The analysis of the severity of amniotic fluid reduction showed no significant correlation with delivery types or low Apgar scores, indicating effective clinical management even in very severe cases. These findings underscore the importance of proper planning, selecting induction methods, and conducting thorough monitoring, which can contribute to reducing complications and improving delivery outcomes.

Limitations of the Study

This study, based on a library design and the collection of clinical data from the files of 40 patients visiting the obstetrics and gynecology department of Abu Ali Sina Regional Educational Hospital in Balkh, faced several limitations.

First, the relatively small sample size may restrict the generalizability of the results to other populations and clinical centers. Second, clinical data were extracted solely from the available files, and some additional information, such as the precise condition of the mother during pregnancy or environmental and social factors, was not accessible. Nevertheless, the findings can serve as a foundation for future studies with larger sample sizes and experimental designs.

Research Recommendations

1. Continuous monitoring of fetal and maternal status before, during, and after labor induction to quickly identify any potential complications and intervene promptly.
2. Training and empowering healthcare personnel regarding various labor induction methods, management of complications, and evaluation of fetal health indicators.
3. Increasing awareness among pregnant mothers about the importance of prenatal care and timely visits in case of decreased fetal movements or warning signs.

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