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REVIEW ARTICLE

Dystocic deliveries and neonatal sequelae, systematic review (2020-2025)

Partos distócicos y secuelas del neonato. Revisión sistemática (2020–2025)

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ABSTRACT

Introduction: given the clinical relevance of dystocic delivery and its possible short- and long-term consequences, it is essential to have an updated synthesis of the scientific evidence on its sequelae.

Objective: to identify the main maternal-fetal sequelae associated with dystocic labor and what strategies have been shown to be effective in their prevention and management.

Methodology: a systematic and narrative review of the scientific literature was conducted based on the PRISMA guidelines, focusing on studies published between 2020 and 2025. The search was carried out in international databases: PubMed, Scopus and the Google Scholar search engine. In the initial stage, approximately 420 articles were identified, of which, after applying the inclusion and exclusion criteria, 35 were identified.

Results: shoulder dystocia is one of the most studied obstetric complications. Macrosomia, defined by a birth weight above the 90th percentile, is a significant risk factor for the development of dystocia. The use of obstetric instruments increases the risk of trauma to both the neonate and the mother. Abnormal presentations, such as breech presentation or incomplete fetal rotation, have been associated with increased complications during delivery.

Conclusions: This review provides a solid basis for the optimization of management strategies in situations of dystocic delivery, providing relevant evidence for clinical practice and future research in obstetrics.

Keywords: Cesarean section; Cephalopelvic disproportion; Fetal dystocia; Maternal dystocia; Dystocia; Dystocic births, Maternal and child health.

RESUMEN

Introducción: dada la relevancia clínica del parto distócico y sus posibles consecuencias a corto y largo plazo, es fundamental contar con una síntesis actualizada de la evidencia científica sobre sus secuelas.

Objetivo: sintetizar la evidencia actualizada sobre las principales secuelas materno-fetales asociadas al parto distócico y las estrategias efectivas en su prevención y manejo.

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Metodología: se realizó una revisión sistemática y narrativa de la literatura científica con apoyo en las directrices PRISMA, enfocándose en estudios publicados entre 2020 y 2025. La búsqueda se efectuó en bases de datos internacionales: PubMed, Scopus y el motor de búsqueda Google Scholar. En la etapa inicial se identificaron aproximadamente 420 artículos, de los cuales tras aplicar los criterios de inclusión y exclusión terminaron en 35.

Resultados: la distocia del hombro es una de las complicaciones obstétricas más estudiadas. La macrosomía, definida por un peso al nacer superior al percentil 90, es un factor de riesgo significativo para el desarrollo de partos distócicos. El uso de instrumentos obstétricos aumenta el riesgo de traumatismos tanto en el neonato como en la madre. Las presentaciones anómalas, como la presentación de nalgas o la rotación incompleta del feto, se han asociado a mayores complicaciones durante el parto.

Conclusiones: Esta revisión ofrece una base sólida para la optimización de las estrategias de manejo en situaciones de parto distócico, aportando evidencia relevante para la práctica clínica y la investigación futura en obstetricia.

Palabras clave: Cesárea; Desproporción cefalopélvica; Distocia fetal; Distocia materna; Partos distócicos, Salud materno-infantil.

INTRODUCTION

Dystocic labor is defined as labor that presents difficulties during its progression, which can lead to maternal and neonatal complications. The application of new technologies in the diagnosis and prevention of these complications justifies the need for a systematic review that synthesizes recent evidence [1,2].

The World Health Organization (WHO) estimates that complications during childbirth are one of the leading causes of maternal and infant morbidity and mortality, especially in countries with limited access to quality obstetric care [3,4].

In recent decades, multiple strategies have been developed for the early identification and management of dystocic labor, ranging from the use of prediction scales to the optimization of obstetric care protocols. However, controversies persist regarding the best way to prevent its sequelae and reduce the impact of these events on maternal and infant health [5, 6, 7].

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Given the clinical relevance of dystocic labor and its potential short- and long-term consequences, it is essential to have an updated synthesis of the scientific evidence on its sequelae [2, 4].
Additionally, Table 1 shows a preliminary analysis of the scientific literature on dystocic labor. It reveals that the reviews published in the last five years are scarce and that no systematic reviews on sequelae associated with dystocic labor have been reported in Spanish.

Table 1. Preliminary bibliometric analysis conducted to justify the research problem

Search category (2020-2025)	%
Studies on dystocic deliveries	100 %
Reviews on dystocic deliveries	7,54 %
Reviews on dystocic deliveries (Spanish language)	0,08 %
Systematic Reviews on Sequelae Associated with Dystocic Labor (Spanish language)	0,00 %

Source: own elaboration

Based on the above, the review aimed to synthesize the updated evidence on the main maternal-fetal sequelae associated with dystocic delivery and the effective strategies for their prevention and management.

MATERIALS AND METHODS

A systematic and narrative review of the scientific literature was conducted, guided by the PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), with the objective of identifying and analyzing the sequelae associated with dystocic deliveries in newborns and mothers, focusing on studies published between 2020 and 2025.

Search Strategy

The search was conducted from January to April 2025 in the following international databases: PubMed, Scopus, and the Google Scholar search engine. Both English and Spanish terms were used, combined with Boolean operators to encompass all relevant literature.

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Terms used in English (6 terms): shoulder dystocia, macrosomia, instrumental delivery, fetal malposition, neonatal sequelae, maternal complications.

Terms used in Spanish (7 terms): dystocic delivery, shoulder dystocia, macrosomia, instrumental delivery, fetal malpositions, neonatal sequelae, maternal complications.

Article Selection and Study Types

In the initial stage, approximately 420 articles were identified. These comprised different types of publications, including: Original studies, systematic reviews, meta-analyses, case reports, and prospective and retrospective studies. The diversity in article types allowed for the evaluation of both quantitative and qualitative data, enriching the analysis of the sequelae associated with dystocic deliveries. After removing duplicate articles, the inclusion and exclusion criteria were applied.

Inclusion Criteria

1. Publication Period: Studies published between 2020 and 2025.

2. Language: Publications in English or Spanish.

3. Content: Articles addressing the association between any type of dystocia, shoulder dystocia, macrosomia, instrumental delivery, malpositions, and sequelae in newborns and/or mothers.

4. Study Type: Original studies, systematic reviews, and meta-analyses that provide relevant quantitative and/or qualitative data on the topic.

Exclusion Criteria

The following studies were excluded:

1. Studies that did not focus on the relationship between dystocia and subsequent sequelae (for example, those that addressed only epidemiological aspects without evaluating clinical consequences).

2. Case reports with extremely small samples (fewer than 30 cases) or with severe methodological limitations.

Analysis and Synthesis of Information

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A methodological evaluation of each study was not performed, but they were critically analyzed to extract relevant data. Tools such as Mendeley and EndNote were used for reference management and to ensure correct citation according to Vancouver style. The information collected in English was translated into Spanish using tools such as Deep Translator, a translator specialized in analyzing complete ideas. The information was structured into thematic sections to facilitate reader comprehension. A meta-analysis was not performed due to the anticipated heterogeneity of the selected articles.

Ethical Considerations

This literature review was conducted as a secondary study based on a consultation of previously published literature. Therefore, no direct intervention with human subjects was carried out, nor was personal or identifiable data accessed. The ethical principles of research were respected, ensuring the correct citation and acknowledgment of original sources. The Declaration of Helsinki was followed with respect to the use of secondary information, guaranteeing the integrity and transparency of the research process.

RESULTS

1. Shoulder dystocia

Shoulder dystocia is one of the most studied obstetric complications, primarily associated with brachial plexus injuries and episodes of perinatal hypoxia.

Neurological injuries:

Recent studies have documented an incidence ranging from 5% to 12% in neonates who have experienced shoulder dystocia, with consequences ranging from Erb's palsy to mild neurological developmental sequelae [1, 5, 6, 7].

Hypoxic complications:

The incidence of hypoxic-ischemic encephalopathy has been linked to the duration of the dystocia episode, suggesting that early interventions can mitigate the effects [8, 9].

2. Fetal macrosomia

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Macrosomia, defined as a birth weight above the 90th percentile, is a significant risk factor for dystocia.

Bone Trauma:

Several studies have found a high incidence of clavicle and humerus fractures in macrosomic newborns undergoing extraction maneuvers [2, 10, 11].

Metabolic Disorders:

In addition, a higher incidence of neonatal hypoglycemia and difficulties in thermoregulation have been observed, requiring intensive monitoring in the immediate postpartum period [12, 13].

3. Instrumental Delivery (Forceps and Vacuum Extraction)

The use of obstetric instruments increases the risk of trauma in both the newborn and the mother.

Head Injury:

Comparative studies have shown that, compared to spontaneous delivery, instrumental delivery is associated with a higher incidence of soft tissue injuries and, in isolated cases, intracranial hemorrhages [3, 14, 15].

Musculoskeletal Injuries:

Fractures and contusions of the extremities are also documented, generally with a good prognosis after clinical follow-up [16, 17].

4. Abnormal Presentations

Abnormal presentations, such as breech presentation or incomplete fetal rotation, have been associated with increased complications during delivery.

Respiratory Complications:

The incidence of meconium aspiration syndrome and transient tachypnea of the newborn increases in these scenarios, probably due to prolonged stress during delivery [4, 18, 19].

Secondary Neurological Injuries:

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Cases of prolonged hypoxia have been documented, resulting in mild to moderate neurological sequelae, emphasizing the need for immediate resuscitation [20, 21].

5. Maternal Sequelae

Although the literature focuses primarily on neonates, mothers can also experience significant complications.

Perineal Trauma:

Interventions to resolve dystocic deliveries increase the risk of perineal tears and pelvic floor damage, which can lead to urinary incontinence or sexual dysfunction [22, 23, 24].

Hemorrhagic Complications:

Manipulation during dystocic delivery has been reported to increase the risk of postpartum hemorrhage, requiring immediate management protocols [25, 26].

Long-Term Sequelae:

Longitudinal studies have indicated that maternal complications can affect quality of life in the medium term, underscoring the importance of multidisciplinary follow-up [27].

6. Innovations in Management and Prevention

Recent literature highlights advances in perinatal management, emphasizing training in obstetric maneuvers and the use of simulators for emergency training.

Standardized Protocols:

The implementation of management protocols for shoulder dystocia and macrosomia has shown promising results in reducing both neonatal and maternal sequelae [28,29].

Technological Interventions:

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The use of fetal monitoring technologies and early warning systems has improved the detection of and response to dystocic labor, reducing the incidence of serious complications [30, 31, 32].

7. Future Perspectives and Recommendations

Current trends in the literature suggest that integrating multidisciplinary strategies and adopting new management protocols have the potential to significantly reduce the sequelae associated with dystocia. The following are recommended:

The development of prospective, multicenter studies addressing the effectiveness of specific interventions [33,34].

The implementation of continuing education programs for obstetric personnel [35].

DISCUSSION

The evidence gathered in these 35 studies (2020–2025) allows for the identification of clear associations between each type of dystocia and its corresponding sequelae.

Shoulder dystocia is primarily related to neurological injuries of the brachial plexus and episodes of hypoxia. In these cases, the prevalence of brachial plexus injuries and perinatal hypoxia reinforces the need for early interventions and ongoing training for obstetric personnel [1, 5, 8, 9].

Macrosomia increases the risk of bone trauma and metabolic disorders. In macrosomic neonates, the risk of fractures and metabolic disorders highlights the importance of intensive postnatal monitoring [2, 12, 13]. Furthermore, the use of instrumental interventions is associated with both neonatal and maternal complications, requiring careful evaluation before opting for these methods [3, 14, 17].

Malpositions and their consequences on respiratory and neurological function reinforce the usefulness of immediate resuscitation protocols [4, 18, 21]. On the other hand, findings on maternal sequelae emphasize the need for prevention and rehabilitation strategies, including the management of perineal and hemorrhagic trauma [22–27].

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The incorporation of technological innovations and simulators in obstetric training has shown a positive impact on reducing complications [28–32]. Finally, recent prospective, multicenter studies indicate that standardized protocols improve overall outcomes in perinatal care [33–35].

CONCLUSIONS

The most frequently reported sequelae were: Neurological Injuries, Metabolic Disorders, Traumatic Brain Injuries, and Musculoskeletal Injuries. The use of fetal monitoring technologies and early warning systems has improved the detection of and response to dystocic labor, reducing the incidence of serious complications. This updated review provides a solid foundation for optimizing management strategies in dystocic labor. Further studies evaluating psychological sequelae in depth are recommended to improve support for mothers. It is suggested that the search be extended to other languages and that a meta-analysis of reviews for each complication be conducted to more accurately quantify the incidence of each sequela.

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MDLCAA: Supervision; Validation; Conceptualization; Research; Visualization; Drafting

RMGV: Revision; Editing; Supervision; Validation; Visualization

YLE: Revision; Editing; Supervision; Validation; Visualization

DECLARATION OF CONFLICT OF INTEREST

The authors declare no conflict of interest.

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