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MESTRADO INTEGRADO EM MEDICINA

# Uterine Rupture in Pregnancy: A 5-Year Retrospective Descriptive Study

Francisco Martins dos Santos

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Trabalhado efetuado sob a orientação de:

Doutor António Álvaro Pereira De Pinho

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FMUP FACULDADE DE MEDICINA
UNIVERSIDADE DO PORTO

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Eu, Francisco Martins dos Santos, abaixo assinado, nº mecanográfico 201906070, estudante do 6º ano do Ciclo de Estudos Integrado em Medicina, na Faculdade de Medicina da Universidade do Porto, declaro ter actuado com absoluta integridade na elaboração do meu trabalho de Dissertação ou Monografia.

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DESIGNAÇÃO DA ÁREA DO PROJECTO

Medicina Clínica

TÍTULO DISSERTAÇÃO/~~MONOGRAFIA~~ (riscar o que não interessa)

Uterine Rupture in Pregnancy over 5 Years: A Retrospective Descriptive Study

ORIENTADOR

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ASSINALE APENAS UMA DAS OPÇÕES:

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Eu, Francisco Martins dos Santos, abaixo assinado, nº mecanográfico 201906070, estudante do 6º ano do Ciclo de Estudos Integrado em Medicina, na Faculdade de Medicina da Universidade do Porto, declaro que:

☒ Não procedi à utilização de ferramentas de *chatbox* generativo baseadas em *large language models* para nenhuma das tarefas no contexto do meu trabalho de Dissertação ou Monografia

☐ Procedi à utilização de ferramentas de *chatbox* generativo baseadas em *large language models* no contexto do meu trabalho de Dissertação ou Monografia, encontrando-se todas as interacções (*prompts* e respostas) transcritas em anexo bem como a indicação das aplicações utilizadas.

Neste sentido, confirmo que a eventual utilização de ferramentas de *chatbox* generativo baseadas em *large language models* no contexto do meu trabalho de Dissertação ou Monografia foi exclusivamente descrita na sequência de *prompts* e respostas transcritos em anexo e nas aplicações indicadas.

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**Article Title:** Uterine Rupture in Pregnancy over 5 Years: A Retrospective Descriptive Study

**Short-Title:** Uterine Rupture over 5 Years

**Authors:**

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Contributorship: ADP and FMDS researched literature, conceived the study, collected and analyzed data and wrote the first draft of the manuscript. OC was involved in gaining ethical approval. All authors reviewed and edited the manuscript and approved the final version of the manuscript.

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**SUMMARY**

Background: Uterine rupture is a rare but serious complication in Obstetrics, associated with maternal and fetal risks. This study evaluates its prevalence and outcomes in a Portuguese hospital.

Methods: A retrospective review of complete uterine rupture cases (2019–2024) was conducted at the Local Health Unit of Tâmega e Sousa. Data included maternal characteristics, obstetric history, and outcomes.

Results: Among 10,447 deliveries, 13 cases of uterine rupture occurred (12.44 per 10,000), primarily in women with prior caesarean sections (84.6%). Abnormal cardiotocography (76.9%) and abdominal pain (23.1%) were common signs. Fetal extrusion occurred in 69.2%. No maternal deaths were recorded, but perinatal mortality was 7.7%. Postpartum haemorrhage affected 61.5%, with five transfusions required.

Conclusion: The prevalence of uterine rupture aligns with rates in developed countries. Caution is advised when using oxytocin in women with prior caesareans. Prompt detection and intervention are crucial to minimize complications.

**Keywords:** caesarean section; clinical presentation; labour; maternal morbidity; pregnancy; uterine rupture.

**Ethical statement:** approved by Institutional Review Board/Comissão de Ética de Saúde, number 33/2022.

**Written informed consent:** not applicable.

## INTRODUCTION

Uterine rupture is a rare obstetric complication associated with elevated rates of maternal and fetal morbidity and mortality [1]. It is defined as a clinically apparent complete separation of all layers of the uterus, occurring during or before labour [2]. The initial signs and symptoms of uterine rupture are typically nonspecific, including fetal heart rate abnormalities, abdominal pain, and vaginal bleeding, making diagnosis challenging and potentially delaying definitive therapy. Consequently, a high index of diagnostic suspicion is required for timely recognition and intervention [3,4]. Prompt surgical management of uterine rupture is critical, as it significantly reduces the risk of permanent fetal and maternal morbidity [5].

Trial of labour after caesarean section (TOLAC) is a recognized risk factor for uterine rupture. Other associated risk factors include induction of labour, labour augmentation with oxytocin, fetal macrosomia, congenital uterine anomalies, prior myometrial surgery, and short intervals between deliveries [6-10].

The prevalence of uterine rupture in developed countries ranges from 0.5 to 7.9 per 10,000 births [11] Over recent decades, the incidence has increased, likely due to the growing number of patients undergoing TOLAC [12], and the rising global rates of caesarean deliveries [13].

There is a scarcity of published data related to uterine rupture in Portugal. The latest report by the Portuguese Health Regulatory Authority (Entidade Reguladora da Saúde, ERS) documented a national caesarean section rate of 38% [14]. In comparison, a 2021 report by the World Health Organization (WHO) indicated a global average caesarean section rate of 21% [15], highlighting that Portugal's caesarean rate seems significantly higher than the international average.

The primary objective of this study is to assess the prevalence of uterine rupture in pregnancy, as well as the associated maternal and neonatal morbidity and mortality, in a hospital setting in Portugal.

## MATERIAL AND METHODS

This study is a retrospective analysis including patients with uterine rupture managed at the Local Health Unit of Tâmega e Sousa, Penafiel, Porto - Portugal, between 2019 and 2024 (5 years). The hospital serves a population of approximately 500,000 individuals, with more than 2000 deliveries per year [16].

The research received approval as an outcome analysis and was registered with the hospital's Ethics Committee. All patient data were de-identified to ensure confidentiality. The information was sourced from two distinct systems: a diagnosis source approach through ObsCare(R), a specialized obstetric clinical records system, and post-event hospital codification. A list of cases was generated based on the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10) codes: O71.0 (spontaneous rupture of the uterus before the onset of labour) and O71.1 (rupture of the uterus during labour).

Maternal characteristics, obstetric history, antenatal and intrapartum events, along with maternal and neonatal outcomes were reviewed using electronic medical records. This case series specifically focused on patients who presented with confirmed cases of complete uterine rupture. Other cases, such as uterine scar dehiscence diagnosed during elective or emergency caeserean were excluded.

Data analysis was conducted using SPSS(R) statistical software version 29.0.2.0 (20) (IBM Corp., Armonk, NY, USA).

## RESULTS

During the 5-year study period, there were a total of 10,447 deliveries, of which 13 involved a complete uterine rupture, resulting in a prevalence of 12.44 per 10,000 deliveries. During this timeframe, the caesarean section rate at the institution was 25.99%. A total of 550 women underwent induction of labour following a previous caesarean section.

All uterine ruptures occurred during labour or induction of labour in the third trimester of pregnancy (in average at 38.46 weeks of gestation, table 1). No cases of uterine rupture during pregnancy outside the context of labour/caesarean section were observed. The mean maternal age was 33.85 years (table 1). The mean body mass index (BMI) was 27.77kg/m2. Among the 13 women who experienced complete uterine rupture, 11 (84.6%) had a scarred uterus due to a previous caesarean section, with a mean interpregnancy interval of 94.64 months following their surgery. No cases were reported in women with a history of other uterine surgeries, such as myomectomy. The majority of these women underwent spontaneous labour, with 3 cases (23.1%) involving induction of labour after a previous caesarean. The prevalence of uterine rupture in inductions after caesarean was 54.5 per 10,000 deliveries. In all three cases, labour induction was performed using oxytocin infusion. Additionally, in 10 out of the 13 cases, oxytocin was utilized for labour augmentation.

The most common sign of uterine rupture in this case-series (table 2) was an abnormal cardiotocography (CTG), observed in 10 women (76.9%). Other signs/symptoms were much less frequent, with abdominal pain being the second most common, reported by 3 women (23.1%). Vaginal bleeding, shoulder pain and loss of fetal station were also represented. Notably, 2 women (15.4%) were asymptomatic, with the diagnosis of uterine rupture made intraoperatively during caesarean section (one elective and another due to prolonged labour).

Of the 13 patients with complete uterine rupture, there were no maternal deaths nor peripartum hysterectomies (table 3). The most common complication was fetal extrusion from the uterus, occurring in 9 cases (69.2%). The majority of ruptures occurred at the lower uterine segment, from extension to the previous caeserean scar, one of them with extension to the cervix and another to the bladder. In the two cases of rupture without previous uterine scar, both were also located in the lower uterine segment. One involved a patient with a history of endometriosis who had previously undergone pelvic surgery.

Postpartum hemorrhage was also frequent, affecting 8 women (61.5%), with a mean blood loss of 812.50 mL. Among these, 5 patients had an estimated blood loss superior to 1000mL and required transfusion. The mean duration of hospital admission for the patients in this study was 4.85 days.

Regarding neonatal outcomes, there was one case of perinatal death (7.7%), and one admission to the neonatal intensive care unit (NICU), which occurred in a twin gestation (table 3). Notably, excluding the perinatal death, no newborn had an APGAR score below 5 at 5 minutes after birth.

## DISCUSSION

The rate of uterine rupture in this series is slightly above that reported by other developed countries and in Europe [17]. However, a retrospective study in Australia found a comparable prevalence [18]. A history of previous caeserean scar is a major contributor to increasing rates of uterine rupture. Considering the global rise in caesarean deliveries, and particularly the elevated rates observed in Portugal, it is anticipated that uterine ruptures during pregnancy may also increase. Although myomectomy is also recognized as a risk factor, it was not observed in this study.

The overall prevalence of rupture in induction after a previous caesarean section was high, as reported previously [22]. At the hospital referenced in this study, oxytocin is the preferred method for inducing labour in such cases, while mechanical methods are rarely employed in patients with an unfavorable Bishop score. Cervical ripening with prostaglandins is not performed under any circumstances in this setting. During the study period, induction of labour in the low-risk population without maternal or fetal complications was preferentially performed at 41 weeks of gestation. This practice may have contributed to an even higher likelihood of uterine rupture.

Nowadays, trends have concentrated on reducing the likelihood of uterine rupture in patients with a history of caesarean section. Specialized techniques, such as ultrasound, can be used to assess scar thickness, though the results remain conflicting [22].

It is well established that augmentation of labour with oxytocin is associated with an increased risk of uterine rupture, particularly in patients with a history of caesarean delivery. In this series, the rate of oxytocin augmentation was notably high (10/13). However, a review of clinical records revealed that the maximum infusion rates thresholds established by the service protocols were not exceeded in any group (144mL/h for a maximum of 180 mL/h without caeserean scar; 84mL/h for a maximum of 120mL/h with previous caeserean), and no cases of tachysystole were observed in CTG. These findings underscore the critical importance of the cautious and judicious use of oxytocin during labour management.

Uterine rupture occurred in two cases without prior caesarean sections, emphasizing the need for vigilance even in pregnancies without typical risk factors. Other population-based studies frequently reported similar cases [6,12,17,19-21]. The first case involved a primigravida with no notable medical or surgical history, who experienced uterine rupture following cervical ripening with misoprostol and labour augmentation using oxytocin. The second case featured a woman with spontaneous onset of labour. She had a history of infertility and pelvic surgery due to deep endometriosis, and a twin gestation achieved through in vitro fertilization. Accordingly, a recent case-series [23] lighted on the potential increased risk of uterine rupture during pregnancy among women who have had a prior resection of deep endometriosis.

Based on the literature, other several factors may play a role (probably less significant) in the likelihood of uterine rupture, including a short interval (<12 to <24 months) after a previous caesarean section - only one case in this series -, abnormal fetal position, excessive amniotic fluid, abnormally invasive placentation, placental abruption,

connective tissue disorders, adenomyosis, trauma, and uterine abnormalities, all non-present [4].

As described in previous studies [24,25], abnormal CTG was the most common sign of uterine rupture. In this study, a marked occurrence of prolonged deceleration and bradycardia was observed. Continuous monitoring of fetal heart rate during labour may play a crucial role in the early detection of uterine rupture. Patients also reported pain in the lower abdomen and shoulders, a symptom particularly relevant in women receiving epidural analgesia.

In this study, no maternal deaths were reported, and the overall perinatal mortality rate was 7.7%, which appears to be lower than previously documented [17,24,25]. Uterine rupture resulted in longer hospitalizations than anticipated for caesarean section postpartum at the institution, typical 48 hours. It was also associated with high rates of peripartum hemorrhage and need for transfusions, resulting in increased morbidity and costs.

The strength of this study lies in the comprehensive review of electronic hospital records for all patients, which was conducted to validate previously routinely coded data. This approach ensured consistency in the definition of complete uterine rupture and a high level of accuracy in patient outcome data. However, this study has several limitations. Its retrospective design and small sample size limits the ability to analyze correlations.

## CONCLUSION

The prevalence of uterine rupture in this study is comparable to or slightly higher than that reported in other developed countries. Uterine rupture, while rare, predominantly occurs during labour, although it is not confined to patients with a history of uterine surgery. Induction of labour and augmentation with oxytocin should be approached with caution to mitigate this obstetric emergency. Maintaining a high clinical index of suspicion is critical to prevent delays and facilitate prompt surgical intervention, thereby minimizing maternal and fetal morbidity and mortality.

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**SUPLEMENTARY MATERIAL**

Table 1 - Baseline and obstetric characteristics in cases of uterine rupture.

| Maternal characteristics | All cases *n*=13 |
|---|---|
| Maternal age in years, mean (SD) | 33.85 (5.08) |
| BMI kg/m$^2$, mean (SD) | 27.77 (3.77) |
| Scarred Uterus, n (%) | |
| Yes | 11 (84.6) |
| No | 2 (15.4) |
| Parity, n (%) | |
| 0 | 2 (15.4) |
| 1 | 9 (69.2) |
| ≥ 2 | 2 (15.4) |
| Gestational age in weeks, mean (SD) | 38.46 (1.81) |
| Previous caesarean section, n (%) | |
| 0 | 2 (15.4) |
| 1 | 10 (76.9) |
| ≥ 2 | 1 (7.7) |
| Interpregnancy interval after caeserean in months, mean (SD) | 94.64 (62.54) |
| Labour, n (%) | |
| Spontaneous labour | 10 (76.9) |
| Induction of labour | 3 (23.1) |

BMI, body mass index; SD, standard deviation.

Table 2 - Signs and symptoms of uterine rupture.

| Signs and symptoms | All cases *n*=13<br>n (%) |
|---|---|
| Abnormal CTG | 10 (76.9) |
| Abdominal pain | 3 (23.1) |
| Loss of fetal station | 2 (15.4) |
| Vaginal bleeding | 1 (7.7) |
| Shoulder pain | 1 (7.7) |
| Asymptomatic | 2 (15.4) |

CTG, cardiotocography.

Table 3 - Maternal and neonatal complications.

| Complications | All cases *n*=13 |
|---|---|
| Maternal complications n (%) | |
| Maternal death | 0 (0.0) |
| Postpartum haemorrhage | 8 (61.5) |
| Postpartum haemorrhage in mL, mean (SD) | 812.50 (258.78) |
| 500–1000 mL | 3 (23.1) |
| ≥1000 mL | 5 (38.5) |
| Blood transfusion | 5 (38.5) |
| Hospital admission in days, mean (SD) | 4.85 (2.79) |
| Hospital admission > 5 days | 5 (38.5) |
| Cervical injury | 1 (7.7) |
| Urinary tract injury | 1 (7.7) |
| Large-volume hemoperitoneum | 2 (15.4) |
| Chorioamnionitis | 3 (23.1) |
| Uterine haemostatic sutures | 1 (7.7) |
| Neonatal complications n (%) | |
| Perinatal death | 1 (7.7) |
| *Remaining Newborn n (%)* | |
| Fetal extrusion out of uterus | 9 (69.2) |
| NICU admission | 1 (7.7) - twin gestation |
| 5 min APGAR < 5 | 0 (0.0) |

APGAR, appearance, pulse, grimace, activity, and respiration; NICU, neonatal intensive care unit; SD, standard deviation.

## APÊNDICES

### STROBE Statement

Uterine Rupture in Pregnancy over 5 Years: A Retrospective Descriptive Study

| | Item Nº | Recommendation | Page Nº |
|---|---|---|---|
| **Title and abstract** | 1 | (*a*) Indicate the study's design with a commonly used term in the title or the abstract | Pag 1 – "Uterine Rupture in Pregnancy over 5 Years: A Retrospective Descriptive Study" |
| | | (*b*) Provide in the abstract an informative and balanced summary of what was done and what was found | Pag 2 – "Material and Methods: A retrospective analysis was conducted on all cases of complete uterine rupture between 2019 and 2024 at the Local Health Unit of Tâmega e Sousa, Portugal. Data were extracted from clinical records, including maternal characteristics, obstetric history, labour events, and patient outcomes. Descriptive statistics were used.<br>Results and Discussion: Among 10,447 deliveries, 13 cases of uterine rupture were identified, yielding a prevalence of 12.44 per 10,000 deliveries. The majority (84.6%) of ruptures occurred in women with previous caesarean sections. Common signs and symptoms included abnormal cardiotocography (76.9%), and abdominal pain (23.1%). Fetal extrusion was a frequent complication (69.2%). No maternal deaths occurred, and the perinatal mortality rate was 7.7%. Postpartum hemorrhage occurred in 61.5% of cases, with 5 requiring transfusions. The mean hospital stay was 4.85 days." |

| | | | |
|---|---|---|---|
| **Introduction** | | | |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported | Pag 3 – "Uterine rupture is a rare obstetric complication associated with elevated rates of maternal and fetal morbidity and mortality. (…) There is a scarcity of published data related to uterine rupture in Portugal." |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses | Pag 3 – "The primary objective of this study is to assess the prevalence of uterine rupture in pregnancy, as well as the associated maternal and neonatal morbidity and mortality, in a hospital setting in Portugal." |
| **Methods** | | | |
| Study design | 4 | Present key elements of study design early in the paper | Pag 4 – "This study is a retrospective analysis including patients with uterine rupture" |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | Pag 4 – "patients with uterine rupture managed at the Local Health Unit of Tâmega e Sousa, Penafiel, Porto - Portugal, between 2019 and 2024 (5 years)." |
| Participants | 6 | (*a*) Give the eligibility criteria, and the sources and methods of selection of participants | Pag 4 – "This case series specifically focused on patients who presented with confirmed cases of complete uterine rupture. Other cases, such as uterine scar dehiscence diagnosed during elective or emergency caesarean were excluded." |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | Pag 4 – "Maternal characteristics, obstetric history, antenatal and intrapartum events, along with maternal and neonatal outcomes were reviewed using electronic medical records. This case series specifically focused on patients who presented with confirmed |

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| | | | cases of complete uterine rupture. Other cases, such as uterine scar dehiscence diagnosed during elective or emergency caeserean were excluded." |
| Data sources/ measurement | 8* | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group | Pag 4 – "The information was sourced from two distinct systems: a diagnosis source approach through ObsCare(R), a specialized obstetric clinical records system, and post-event hospital codification." |
| Bias | 9 | Describe any efforts to address potential sources of bias | Pag 4 – "The information was sourced from two distinct systems" |
| Study size | 10 | Explain how the study size was arrived at | Pag 4 – "A list of cases was generated based on the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10) codes: O71.0 (spontaneous rupture of the uterus before the onset of labour) and O71.1 (rupture of the uterus during labour)." |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | Pag 4 – "Data analysis was conducted using SPSS(R) statistical software version 29.0.2.0 (20) (IBM Corp., Armonk, NY, USA)." |
| Statistical methods | 12 | (*a*) Describe all statistical methods, including those used to control for confounding | Pag 4 – "Data analysis was conducted using SPSS(R) statistical software version 29.0.2.0 (20) (IBM Corp., Armonk, NY, USA)." |
| | | (*b*) Describe any methods used to examine subgroups and interactions | Not applicable, since this study does not include subgroup analyses or interactions. |
| | | (*c*) Explain how missing data were addressed | Not applicable. All required clinical records were available. |
| | | (*d*) If applicable, describe analytical methods taking account of sampling strategy | Not applicable, all cases of complete uterine rupture in the hospital records were included, making it a total population study rather than a sampled subset. |

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| | | (*e*) Describe any sensitivity analyses | Not applicable, this study is a descriptive study focusing on prevalence and clinical characteristics rather than statistical modeling. |
| **Results** | | | |
| Participants | 13* | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed | Pag 5 - "During the 5-year study period, there were a total of 10,447 deliveries, of which 13 involved a complete uterine rupture, resulting in a prevalence of 12.44 per 10,000 deliveries." |
| | | (b) Give reasons for non-participation at each stage | Not applicable. This study is a retrospective analysis of all confirmed cases of uterine rupture during the study period. There was no active recruitment or invitation for participation. |
| | | (c) Consider use of a flow diagram | Not applicable. All cases of uterine rupture recorded in hospital files were included in the study. Since there were no exclusions at different study stages, a flow diagram would not provide additional information. |
| Descriptive data | 14* | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders | Pag 5 – "The mean maternal age was 33.85 years (table 1). The mean body mass index (BMI) was 27.77kg/m2. Among the 13 women who experienced complete uterine rupture, 11 (84.6%) had a scarred uterus due to a previous caesarean section, with a mean interpregnancy interval of 94.64 months following their surgery. No cases were reported in women with a history of other uterine surgeries, such as myomectomy. The majority of these women underwent spontaneous labour, with 3 cases (23.1%) involving |

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| | | | induction of labour after a previous caesarean." |
| | | (b) Indicate number of participants with missing data for each variable of interest | Not applicable. There was no missing data. |
| Outcome data | 15* | Report numbers of outcome events or summary measures | Pag 5 – "During the 5-year study period, there were a total of 10,447 deliveries, of which 13 involved a complete uterine rupture"<br>Pag 5 – "The mean maternal age was 33.85 years (table 1). The mean body mass index (BMI) was 27.77kg/m2. Among the 13 women who experienced complete uterine rupture, 11 (84.6%) had a scarred uterus due to a previous caesarean section, with a mean interpregnancy interval of 94.64 months following their surgery. No cases were reported in women with a history of other uterine surgeries, such as myomectomy. The majority of these women underwent spontaneous labour, with 3 cases (23.1%) involving induction of labour after a previous caesarean. The prevalence of uterine rupture in inductions after caesarean was 54.5 per 10,000 deliveries. In all three cases, labour induction was performed using oxytocin infusion. Additionally, in 10 out of the 13 cases, oxytocin was utilized for labour augmentation."<br>Pag 5 – "The most common sign of uterine rupture in this case-series (table 2) was an abnormal cardiotocography (CTG), observed in 10 women (76.9%). Other signs/symptoms were much less frequent, with abdominal |

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| | | | pain being the second most common, reported by 3 women (23.1%). Vaginal bleeding, shoulder pain and loss of fetal station were also represented. Notably, 2 women (15.4%) were asymptomatic, with the diagnosis of uterine rupture made intraoperatively during caesarean section (one elective and another due to prolonged labour).<br>Of the 13 patients with complete uterine rupture, there were no maternal deaths nor peripartum hysterectomies (table 3). The most common complication was fetal extrusion from the uterus, occurring in 9 cases (69.2%).”<br>Pag 5/6 – “Postpartum hemorrhage was also frequent, affecting 8 women (61.5%), with a mean blood loss of 812.50 mL. Among these, 5 patients had an estimated blood loss superior to 1000mL and required transfusion. The mean duration of hospital admission for the patients in this study was 4.85 days.<br>Regarding neonatal outcomes, there was one case of perinatal death (7.7%), and one admission to the neonatal intensive care unit (NICU), which occurred in a twin gestation (table 3). Notably, excluding the perinatal death, no newborn had an APGAR score below 5 at 5 minutes after birth.” |
| Main results | 16 | (*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which | All estimates are unadjusted, as this study follows a purely descriptive approach. The data is presented in tables, reflecting the direct prevalence and clinical characteristics of |

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| | | confounders were adjusted for and why they were included | the included cases without statistical adjustments. |
| | | (*b*) Report category boundaries when continuous variables were categorized | Not applicable. All continuous variables were analysed as means and standard deviations, without categorization. |
| | | (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period | Not applicable. Given that this study is descriptive, relative risk was not calculated. |
| Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses | Not applicable. The study does not involve sample subdivisions, interaction analyses, or sensitivity tests. The objective was to describe the prevalence and clinical findings of the included cases. |
| **Discussion** | | | |
| Key results | 18 | Summarise key results with reference to study objectives | Pag 9 – "The prevalence of uterine rupture observed in this series suggests a recent increasing trend in the incidence of this diagnosis." |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | Pag 8 – "However, the study has several limitations. Its retrospective design and small sample size limits the ability to analyze correlations." |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | Pag 7 – "The rate of uterine rupture in this series is slightly above that reported by other developed countries and in Europe (…) Considering the global rise in caesarean deliveries, and particularly the elevated rates observed in Portugal, it is anticipated that uterine ruptures during pregnancy may also increase."<br>Pag 7 – "The overall prevalence of rupture in induction after a previous caesarean section was high, as reported previously."<br>Pag 7 – "It is well established that augmentation of labour with oxytocin is associated |

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| | | | with an increased risk of uterine rupture, particularly in patients with a history of caesarean delivery."<br>Pag 8 – "As described in previous studies, abnormal CTG was the most common sign of uterine rupture."<br>Pag 8 – "In this study, no maternal deaths were reported, and the overall perinatal mortality rate was 7.7%, which appears to be lower than previously documented." |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results | Pag 7 – "However, a retrospective study in Australia found a comparable prevalence."<br>Pag 8 – "This approach ensured consistency in the definition of complete uterine rupture and a high level of accuracy in patient outcome data." |
| **Other information** | | | |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | Not applicable, there was no funding for the conduction of this study. |

*Give information separately for exposed and unexposed groups.

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REPÚBLICA PORTUGUESA
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UNIDADE LOCAL DE SAÚDE
TÂMEGA E SOUSA

Penafiel, 7th December 2024

On behalf of the Obstetrics Department of the Tâmega and Sousa Local Health Unit, I hereby authorize the study “Uterine Rupture in Pregnancy: A 5-Year Retrospective Descriptive Study”. This project is part of the study “Divulgação de Indicadores Obstétricos Nacionais”, approved by the institution's Ethics Committee on 28th April 2023 (Official Letter No: 33/2022).

Assinado por: **OLÍMPIA TRIGO DO CARMO**
Num. de Identificação: 03700903
Data: 2024.12.07 12:49:34+00'00'

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**Exmo. (a) Senhor(a)**

Dra Juliana da Silva Rocha

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**ASSUNTO:** ***"Divulgação de indicadores Obstétricos Nacionais"***

Exma Senhora Dra Juliana da Silva Rocha,

Acusamos a receção do seu pedido para realização do estudo "***Divulgação de indicadores Obstétricos Nacionais***".

Agradecemos a preferência pela nossa instituição.

A Comissão Ética de Saúde não tem objeção ética à realização do estudo no CHTS, nas condições referidas no mesmo.

Informamos que, em reunião de Conselho de Administração de 26/04/2023 foi autorizada a realização do estudo, podendo o mesmo dar início, nos termos do Parecer da Comissão.

No final da realização do estudo deverá entregar, no Centro Hospitalar do Tâmega e Sousa, no Serviço de Ensino, Formação e Investigação (SEFI), **o relatório final, sendo este de carácter obrigatório.**

Estamos ao dispor para qualquer informação ou esclarecimento que entenda solicitar.

Com os melhores cumprimentos,

A Diretora do SEFI,

Eliana P.D. Pereira

(Eliana Pereira, Dra)

FACULDADE DE **MEDICINA**