Histological Chorioamnionitis Associated with Preterm Prelabour Rupture of Membranes at Kingston General Hospital: A Practice Audit

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Abstract

Objective: To determine the prevalence of histological chorioamnionitis associated with preterm prelabour rupture of membranes (PPROM) in women following spontaneous onset of labour, urgent delivery or planned delivery after 34 weeks' gestation.

Methods: Charts of all women admitted to Kingston General Hospital with PPROM prior to 34 weeks' gestation over five years were collected. Obstetrical outcomes and histopathology reports were reviewed.

Results: Two hundred forty-four women with PPROM were identified and reviewed. The majority of women (169; 69%) went into spontaneous labour and, of those, 24 (14%) had clinical chorioamnionitis and 79 (47%) had histological chorioamnionitis. Of the 45 women (18%) who required urgent delivery, 27 (60%) had clinical chorioamnionitis and 31 (69%) had histological chorioamnionitis. Only 26 of the original 244 women with PPROM (11%) were managed expectantly until 34 weeks' gestation and then had a planned delivery. The prevalence of histological chorioamnionitis in this group whose placentas were sent for histopathologic review was 24%. Overall, the clinical suspicion of chorioamnionitis was found to be specific (91%) but not sensitive (37%) for identifying chorioamnionitis on the basis of histopathology.

Conclusion: Histological chorioamnionitis complicates almost one half of all cases of PPROM that occur prior to 34 weeks' gestation. Most women will progress to spontaneous labour or require urgent delivery for clinical chorioamnionitis or other complications related to ruptured membranes before reaching 34 weeks' gestation. Only a subset of women remain pregnant long enough to have labour induced, but among those the prevalence of histological chorioamnionitis is lower (24%).

Key Words: Fetal membranes, premature rupture, chorioamnionitis, premature birth

Competing Interests: None declared.

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Résumé

Objectif : Déterminer la prévalence de la chorioamnionite histologique associée à la rupture prématurée des membranes préterme (RPMP) chez les femmes à la suite de l'apparition spontanée du travail, d'un accouchement d'urgence ou d'un accouchement planifié après 34 semaines de gestation.

Méthodes : Les dossiers de toutes les femmes admises, au cours d'une période de cinq ans, à l'hôpital général de Kingston en raison d'une RPMP avant 34 semaines de gestation ont été rassemblés. Les issues obstétricales et les rapports d'histopathologie ont fait l'objet d'une analyse.

Résultats : Deux cent quarante-quatre femmes présentant une RPMP ont été identifiées et leurs dossiers ont fait l'objet d'une analyse. La majorité des femmes (169; 69 %) ont connu un travail spontané et, de celles-ci, 24 (14 %) ont présenté une chorioamnionite clinique et 79 (47 %) ont présenté une chorioamnionite histologique. Chez les 45 femmes (18 %) qui ont nécessité un accouchement d'urgence, 27 (60 %) ont présenté une chorioamnionite clinique et 31 (69 %) ont présenté une chorioamnionite histologique. Seulement 26 des 244 femmes présentant une RPMP qui ont été identifiées à l'origine (11 %) ont fait l'objet d'une prise en charge non interventionniste jusqu'à 34 semaines de gestation, pour ensuite connaître un accouchement planifié. Au sein de ce groupe, la prévalence de la chorioamnionite histologique (dans les cas où le placenta a fait l'objet d'une analyse histopathologique) a été de 24 %. De façon globale, nous avons constaté que les soupçons cliniques à l'égard de la présence d'une chorioamnionite étaient spécifiques (91 %), mais non sensibles (37 %), pour ce qui est de l'identification de la chorioamnionite en fonction de l'histopathologie.

Conclusion : La présence d'une chorioamnionite histologique complique près de la moitié de tous les cas de RPMP qui se manifestent avant 34 semaines de gestation. La plupart des femmes en viendront à connaître un travail spontané ou à nécessiter un accouchement d'urgence motivé par la présence d'une chorioamnionite clinique ou d'autres complications liées à la rupture des membranes avant 34 semaines de gestation. Seul un sous-ensemble de femmes demeurent enceintes assez longtemps pour pouvoir faire l'objet d'un déclenchement du travail; toutefois, chez ces femmes, la prévalence de la chorioamnionite histologique est moindre (24 %).

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INTRODUCTION

Preterm prelabour rupture of membranes (PPROM) occurs in 2% to 3% of pregnancies and can have profound implications for the pregnancy outcomes of both mother and fetus.[1] The most significant complications of PPROM are prematurity and intrauterine infection, both of which carry considerable risk of short- and long-term sequelae for the newborn.[2] The use of antibiotics and corticosteroids in the expectant management of women with PPROM has been shown to reduce the risk of major neonatal morbidity in preterm infants.[3,4] In keeping with these findings, it is our centre's practice to manage women with PPROM expectantly until 34 weeks' gestation, when labour is induced. However, the optimal time for delivery between 32 and 37 weeks is unclear. There is great variability among regional protocols and no consensus among academic centres.[1,5–12] Many women who are managed expectantly deliver earlier because of the spontaneous onset of labour or because they develop clinical evidence of intrauterine infection, known as clinical chorioamnionitis. Chorioamnionitis is defined as infection of the chorioamnion and is thought to be both a cause and a consequence of PPROM.[10] A multicentre, prospective study in 2009 showed that when adjusted for gestational age, chorioamnionitis in preterm infants is strongly associated with an increased risk of early sepsis as well as severe intraventricular hemorrhage.[13] Elevated levels of cytokines in the blood and brain in response to maternal infection are thought to cause neurotoxic damage to fetal white matter. This produces the so-called fetal inflammatory response syndrome, leading to intraventricular hemorrhage, periventricular leukomalacia, and cerebral palsy.[14] For this reason, the treatment of chorioamnionitis includes early administration of parenteral antibiotics and expeditious delivery.

Antenatal signs and symptoms used to diagnose clinical chorioamnionitis often appear late, by which point the fetus may have already mounted an inflammatory response. At our institution, a protocol has been established to submit all placentas from cases of PPROM for histopathologic review. Histological chorioamnionitis is defined as the presence of infiltrating polymorphonuclear leukocytes within the amniotic membranes, chorionic plate, and/or umbilical cord. Although the association is not as strong as with clinical chorioamnionitis, there remains a clinically significant association between histological chorioamnionitis and periventricular leukomalacia leading to cerebral palsy in the preterm neonatal population.[15]

If there is no evidence of preterm labour, chorioamnionitis, or fetal distress, women who have a diagnosis of PPROM are admitted at our centre for expectant management with prophylactic antibiotics and a single course of corticosteroids.[16] From this point onwards, three potential obstetrical outcomes become manifest:

- Group 1: Onset of spontaneous labour and delivery prior to 34 weeks' gestation;
- Group 2: Change in maternal or fetal status requiring urgent delivery;
- Group 3: Expectant management until planned delivery at 34 weeks' gestation.

The primary goal of this study was to determine the risk of histological chorioamnionitis in women with PPROM associated with these three obstetrical outcome groups: spontaneous onset of labour (Group 1), need for urgent delivery (Group 2), or planned delivery at 34 weeks (Group 3). The timing of delivery cannot be modified in Groups 1 and 2, as these women declare themselves early. However, the timing of delivery for women in Group 3 may be modified if the results suggest a high risk of subclinical (i.e., histological) chorioamnionitis, as seen on histopathologic review of the placentas postpartum.

METHODS

Data were collected from charts of all women admitted to Kingston General Hospital between January 2005 and December 2009 with PPROM before 34+0 weeks. To retrieve these data, a broad search was undertaken in the Better Outcomes Registry Network perinatal database to capture all women who delivered at less than 35 weeks' gestation for any reason. All cases were then reviewed using paper and/or electronic hospital charts to include only those who presented with PPROM at less than 34+0 weeks. Discharge records, interdisciplinary records, procedure notes, and pathology reports were reviewed. Gestational age when rupture of membranes was confirmed and gestational age at delivery were recorded to calculate the latency period. Labour type (spontaneous vs. induced), delivery type (vaginal vs. Caesarean section), and presence of clinical and/or histological chorioamnionitis were recorded.

This study was approved by the Queen's University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board.

RESULTS

Between January 2005 and December 2009, 244 women presented to Kingston General Hospital with PPROM at or before 34 weeks' gestation and subsequently delivered. Overall, 115 (47%) women had evidence of histological