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Case Report

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Are Intrapartum Antibiotics Warranted for Isolated Thick-Meconium-Stained Amniotic Fluid? A Report of a Near-Miss Case

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Abstract

Meconium-stained amniotic fluid (MSAF) affects 5-20% of women in labor. Whether it is indicative of fetal distress or not remains unresolved. Nonetheless, there is a growing body of evidence implicating thick-MSAF in particular, in adverse perinatal and maternal outcomes. Thick-MSAF is a well-recognized risk factor for the development of intraamniotic infection (IAI), yet it is not, by itself, an indication to initiate antibiotics unless other robust conventional features suggestive of IAI are present. Nevertheless, the strong association between thick-MSAF and peripartum maternal infections has inspired researchers to explore the role of some intrapartum prophylactic antibiotics, without totally resolving this issue. Herein, we describe the clinical course of a woman with thick-MSAF. Her postpartum period was complicated by early development of watery diarrhea, endomyometritis, severe septicemia, and a protracted intensive care unit (ICU) stay. The precipitous occurrence of watery diarrhea and severe septicemia in the absence of positive pancultures as a consequence of thick-MSAF has not been previously reported. We believe that isolated thick-MSAF should be considered a robust clinical marker of IAI, independent of the presence of other signs and symptoms suggestive of IAI. Until future studies determine the effectiveness and identify the optimal antibiotic, we recommend administering antibiotics currently employed in the intrapartum treatment of IAI.

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Introduction

The etiology of intrapartum meconium continues to be elusive. It might be attributed to fetal hypoxia/distress or simply reflects a physiologic event. Irrespective of the underlying etiology that triggers its release, its presence might initiate a plethora of chemical, immunological events that culminate in adverse perinatal and maternal outcomes [1]. These adverse outcomes are further amplified with increasing meconium-stained amniotic fluid (MSAF) thickness [2]. Commonly reported maternal complications include chorioamnionitis (IAI) and endometritis [2], a higher cesarean section rate [3], along with increased postpartum hemorrhage [4], and surgical site infection (SSI) [5]. Perinatal adverse outcomes include infectious (neonatal sepsis) and respiratory complications (meconium aspiration syndrome (MAS)). The majority of clinical management guidelines were devoted to the prevention of perinatal complications, whereas guidelines dedicated to mitigating MSAF-related maternal complications are nonexistent. The strong association between MSAF and maternal infectious complications provided a rationale for exploring the role of antibiotic administration in the prevention of MSAF-related complications [1]. In a Cochrane review of two randomized controlled trials (RCTs) investigating the role of ampicillin/sulbactam in cases of MSAF, this regimen was significantly effective in decreasing the rate of IAI but had no significant impact on postpartum endomyometritis and failed to exert any benefit on adverse neonatal outcomes [6]. Due to the lack of conclusive evidence elucidating its effectiveness, the routine use of intrapartum antibiotics has not been supported by any specialized societies, unless thick-MSAF was accompanied by other robust clinical features highly suggestive of IAI, such as maternal fever, fetal tachycardia, and leukocytosis [7]. Hereby, we report a woman with thick-MSAF whose postpartum course was complicated by early watery diarrhea, endomyometritis, severe sepsis (disseminated intravascular coagulation (DIC), pancytopenia, septic shock),

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acute abdomen (septic peritonitis), and a prolonged intensive care unit (ICU) stay. These morbidities were attributed to the intrapartum presence of thick-MSAF. To our knowledge, this is the first reported case of severe sepsis attributed to isolated thick-MSAF in the literature.

Case Report

This was a 28-year-old healthy primigravid woman who presented at 42 completed weeks of gestation to our maternity unit with active labor. Spontaneous rupture of membranes revealed thick-MSAF. Cardiotocography (CTG) later demonstrated fetal bradycardia reaching 60 BPM that commanded the performance of emergent cesarean delivery. She was delivered of a live newborn female weighing 3,400 g with normal Apgar's, transferred to the neonatal intensive care unit (NICU) for observation. The surgery was without incidents with an operative time of 30 min, and an estimated blood loss of 600 mL. Pre-op labs showed hemoglobin (Hb) of 9.4 g/dL, white blood cell (WBC) of 7.3 × 10^9, platelet of 108 × 10^9, and a normal coagulation profile.

The next morning, Hb was 6.6 g/L, WBC was 2.8 × 10^9, and platelet was 79 × 10^9. The patient complained of profuse watery diarrhea associated with abdominal cramps, without nausea or vomiting. Otherwise, she was not distressed, had stable vital signs, good urine output, and passed flatus, with a well-contracted uterus, minimal vaginal bleeding, and a clean wound. Repeat labs a few hours later showed Hb of 8.6 g/L, WBC of 0.81 × 10^9, platelet of 21 × 10^9, prolonged prothrombin time (PT), partial thromboplastin time (PTT), and international normalized ratio (INR) together with disturbed electrolytes, metabolic acidosis, and elevated C-reactive protein (CRP) of 271 mg/L. Examination revealed a clean wound and a soft abdomen with mild diffuse tenderness.

Day 3 postpartum featured the development of high-grade fever, deterioration of vital signs, worsening of diarrhea, progression to a rigid surgical abdomen, and a further decline in labs that showed Hb of 6.6 g/L, hematocrit (Hct) of 20%, WBC of 0.94 × 10^9, platelet of 16 × 10^9, PTT of 54 s, INR of 1.27%, and CRP of 244 mg/L, and hemodynamic instability. Abdominal ultrasound showed no fluid collections. The same evening, she was transferred to the ICU and started on meropenem. A computed tomography (CT) scan precluded the presence of collections/hematomas, with the presence of extensive subcutaneous fat stranding and edema in the pelvis and lower anterolateral abdominal wall adjacent to the surgical scar associated with numerous soft tissue air pockets. Extensive abdominopelvic free air pockets suggest septic peritonitis. Moreover, the uterus showed intraluminal and endometrial air pockets consistent with endomyometritis. Small bowls were mildly distended with diffuse wall thickening and edema. The caring multidisciplinary team opted for laparotomy due to acute abdomen/septic peritonitis and hemodynamic instability.

The exploratory laparotomy revealed a large amount of foul-smelling pus and a greyish necrotic uterine incision, together with necrosis of a patch of the overlying rectus fascia. Bowel integrity was checked. Limited debridement of an adjacent necrotic fascial patch was done, followed by abdominal hysterectomy due to extensive uterine incisional necrosis. The cervix was extensively friable, blackish, and foul-smelling.

The patient had a protracted course in the ICU, where she received multiple transfusions and different antibiotic regimens. Finally, diarrhea ceased on day 11 while fever disappeared on day 13 postpartum. Surprisingly, all culture results (urine, surgical, and peritoneal fluid) were sterile. The patient was discharged on day 17 after being afebrile for 48 h, to receive intramuscular (IM) antibiotics for a further 10 days. Finally, she was contacted 1 month later when recovery was confirmed. The neonate was observed for 3 days and was eventually discharged home in good condition.

Discussion

The clinical significance of isolated MSAF remains unresolved, as the majority of affected newborns or parturients do not suffer adverse outcomes. Nevertheless, thick-MSAF has long been recognized as an obstetric hazard and a well-established risk factor for maternal infectious morbidities [1]. A causality relationship between thick-MSAF and adverse maternal outcomes has not been established, yet clinical evidence of a strong association is well-recognized [8].

The precise mechanism by which MSAF can provoke tissue/organ damage is poorly understood. Although meconium itself is not infectious, it can alter the intrauterine environment in ways that may increase the risk of maternal infections by acting as a growth medium for bacteria, inhibiting the amniotic fluid's antibacterial properties, and antagonizing the host's defense system, thereby increasing the risk of infection. However, other mechanisms can also participate in the pathogenesis of the injury, including mechanical, chemical, inflammatory, and immunological [1, 9]. No single hypothesis can explain all MSAF-related complications, and the precise etiology might involve several mechanisms that can act sequentially or in combination.

In this case, thick-MSAF was identified intrapartum, but antibiotics were not offered due to the absence of recommendations. Moreover, IAI was not suspected, and the intrapartum course was normal except for the development of fetal distress. The patient developed watery diarrhea within 12 h postpartum and then thrombocytopenia, DIC, and anemia on day 2 postpartum. The third postpartum day featured pancytopenia, fever, hemodynamic instability, and acute abdomen. These complications required the performance of a laparotomy and hysterectomy. After a protracted clinical course, diarrhea and fever subsided, and discharge was possible on day 17 postpartum. The administration of prophylactic antibiotics (2 g cefazolin) 1 h before cesarean delivery did not prevent maternal infectious complications. The absence of any bacterial growth in blood, urine, peritoneal fluid, or necrotic tissues aligns with the hypothesis of a sterile intense inflammatory reaction suggested by Yamada et al [10]. A chemical injury affecting the bowels, leading to watery diarrhea, could have been induced by intraperitoneal thick meconium debris disseminated during cesarean section. Furthermore, endometritis, cervical necrosis, and uterine incisional necrosis could also be caused by MSAF left in the cervical canal or in the vescico-uterine recess during the cesarean

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delivery. Consequently, performing a thorough and meticulous intrauterine and peritoneal lavage to remove any spilled thick-MSAF debris during cesarean delivery is highly advisable. The contribution of multiple mechanisms to the pathogenesis of the above morbidities is akin to the scenario seen with MAS, where postpartum antibiotics have been demonstrated to be ineffective due to the complex nature of MAS [11].

Unfortunately, there are no guidelines for the management of women exhibiting isolated thick-MSAF during labor. The WHO recommended against routine antibiotic administration for women with MSAF in the absence of other conventional markers of intraamniotic infection due to a lack of evidence [7]. Nevertheless, the high suspicion of an infectious etiology of MSAF-related complications inspired many authors to explore the effect of using prophylactic intrapartum antibiotics [8]. A systematic review explored the results of two RCTs using ampicillin + sulbactam versus placebo. This treatment appeared to decrease the frequency of IAI while exerting no significant reduction in postpartum endometritis or adverse neonatal outcomes [6]. This, however, should not discredit the concept of prophylactic antibiotics, but would rather indicate that most probably different antibiotics might be more effective. The close association of thick-MSAF with postpartum infectious morbidities makes it prudent to initiate an intrapartum prophylactic antibiotic. The available evidence acquired from the only Cochrane review on the use of ampicillin/sulbactam verifies a benefit limited to preventing IAI only. Antibiotics currently used in the treatment of clinical IAI may prove more effective in preventing endometritis and other more severe complications. Sepsis/septic shock has been previously attributed to clinical IAI, but to our knowledge, this is the first reported case of severe sepsis to complicate isolated thick-MSAF.

Conclusion

Thick-MSAF has long been recognized as an obstetric hazard, and its strong association with intrapartum and puerperal infectious morbidities is well-established. This patient demonstrated unusual complications in the form of early watery diarrhea and severe sepsis. The intrapartum administration of prophylactic antibiotics upon recognition of thick-MSAF, previously reported by Piper et al, could have prevented the sepsis [12]. Well-designed, RCTs are needed to delineate the benefits and the identity of the "optimal prophylactic antibiotics" in women with isolated thick-MSAF.

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Conflict of Interest

The authors individually declared no competing interests.

Informed Consent

Written informed consent was obtained from the patient for publication of this case report.

Author Contributions

KR participated in the conceptualization and manuscript writing. MKR participated in the conceptualization, wrote the manuscript, and performed the literature search. IH participated in the conceptualization and the writing of the manuscript. HB and FH collected data on the case and participated in the literature search. GY participated in the conceptualization and coordination of work. All authors have read and approved the manuscript.

Data Availability

The authors declare that data supporting the findings of this study are available from the corresponding author upon reasonable request.

Abbreviations

BPM: beats per minute; DIC: disseminated intravascular coagulopathy; IAI: intraamniotic infection; MAS: meconium aspiration syndrome; MSAF: meconium-stained amniotic fluid; NICU: neonatal intensive care unit; RCTs: randomized controlled trials; SSI: surgical site infection

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