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CASE REPORT

Acinetobacter baumannii infection during pregnancy and puerperium

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Abstract *Acinetobacter baumannii* is a multidrug-resistant bacterium that is normally a commensal pathogen. This bacterium can lead to severe complications such as pneumonia, fever and septicaemia, because of limited treatment options. This case report describes a cervical *A. baumannii* infection during pregnancy and puerperium in a case of a patient treated in our hospital, because of insufficiency of cervix diagnosed in the 28 + 3 week of gestation. In spite of antibiotic treatment, the patient developed increasing contractions and chorioamnionitis, resulting in caesarean section in the 31st week of gestation. Moreover, although being treated with carbapenems, the patient presented postpartal with fever and septic symptoms, which could only be treated by escalation of the dosage of the given carbapenem. In conclusion, *A. baumannii* can lead to premature contractions and can be associated with chorioamnionitis during pregnancy. Moreover, it can also cause septic complications in the puerperium associated with long duration of hospitalisation. The management and therapy of this vaginal infection during pregnancy and puerperium is a real challenge to gynaecologists and obstetricians.

Keywords *Acinetobacter baumanni* · Septicaemia · Pregnancy · Puerperium · Insufficiency of cervix

Introduction

Acinetobacter spp. have emerged in recent years as a major cause of nosocomial infections that are associated with significant morbidity and mortality [1–3]. Historically, *Acinetobacter* spp. have been associated with opportunistic infections that were rare and of modest severity. However, the last two decades have seen an increase in both the incidence and seriousness of *A. baumannii* infection, with the main targets being patients in intensive-care units. Although this organism appears to have a predilection for the most vulnerable patients, community-acquired *A. baumannii* infection is an increasing cause for concern [4].

In this case report, we present a course of a vaginal *A. baumannii* infection during the pregnancy and puerperium in a patient treated for a cervical insufficiency diagnosed in the 29th week of gestation. In her 31st week of gestation, the patient demonstrated chorioamnionitis and contractions and a caesarean section was performed. Postoperatively the young mother presented with fever and septic symptoms, which were treated with an antibiotic regime according to the suspected *A. baumannii* infection.

Case report

A 32-year-old third gravida, para 0 woman of Caucasian origin was admitted to our hospital at the 28 weeks and 3 days of gestation from her gynaecologist with insufficiency of cervix; she had neither contractions nor bleeding and the amniotic sac was intact. The woman was already inpatient in our hospital once in the 15 weeks of gestation due to vaginal bleeding.

The vaginal examination on admission revealed a shortened (0.5 cm) and slightly opened (1 cm) cervix. Laboratory findings demonstrated normal results with the exception of a slightly elevated CRP (0.74 mg/dl; physiological range <0.5 mg/dl); the leukocyte count (WBC) was normal (10.9 G/l: physiological range 4.0–11.0 G/l). The bacteriological smear

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detected the following results: few coagulase-negative Staphylococci, many *Enterococcus faecalis*, moderate *Haemophilus parainfluenzae*, and few *Candida krusei*. Prenatal ultrasound was without any pathological findings, except the shortened cervix length. The patient was provided with strict bed rest, intravenous tocolysis with fenoterol 12 ml/h. Betamethasone i.m. for the maturation of foetal lungs and antibiotic treatment with intravenous cephalosporin (cefuroxime) was started as empirical antimicrobial therapy for bacterial colpitis. After 1 week (29 weeks and 4 days of gestation), the patient developed premature contractions and some of the serological inflammatory values were increasing (CRP 1.60 mg/dl; but normal leucocytes: 9.1 G/l). An amniocentesis was performed to exclude a chorioamnionitis. The level of intramniotic interleukin 6 was 469 pg/ml (normal range in our clinic is up to 10,000 pg/ml) in human serum. The control microbiological analysis of the cervix demonstrated a few coagulase-negative Staphylococci, many *Escherichia coli*, many *A. baumannii*. The *E. coli* was thought to be the reason for such early contractions, and a local therapy with 10 mg dequaliniumchloride suppositories once a day was started. However, the patient's status did not improve clinically; the patient had more contractions in spite of increasing dosage of tocolysis (36 ml/h) and the cervix-insufficiency was progressive (cervix was 3 cm opened). The bacteriological smear was repeated after the local therapy again demonstrating moderately coagulase-negative Staphylococci, many *Enterococcus* species, moderately non-haemolytic Streptococci, moderate *E. coli* and moderate *A. baumannii*. The performed antibiotic resistant analysis demonstrated sensitivity of all isolated bacteria to meropenem. Because of the worsening of contractions, elevation of CRP (1.23 mg/dl) and considering *A. baumannii* being the cause of the infection, intravenous meropenem was added to the treatment regimen. Simultaneously, it was decided to repeat the amniocentesis in order to exclude a chorioamnionitis. Intraamniotic interleukin 6 in amniotic fluid was elevated to 1320 pg/ml. Due to clinical and laboratory findings, the diagnosis of a chorioamnionitis was considered and a primary caesarean section was performed at the same day. The newborn weighed 2,035 g with a length of 42 cm long and APGAR indices of 7/9/10/10. The umbilical artery pH was 7.30 with a base excess of −4. For the intrauterine-acquired chorioamnionitis, the newborn was treated with ampicillin, cefotaxime and tobramycin in high dosage for 5 days. The serological inflammatory values were then in physiological range, so the antibiotic treatment was stopped. However, the pharyngeal ventilation was continued because of tachypnoea and dyspnoea till the seventh day of life.

On the second postoperative day, the young mother developed recurrent fever 39.2°C in spite of the treatment with meropenem 500 mg i.v. trice daily. The palpation of abdomen was painful and the inflammatory values were increasing rapidly (leukocytes 17.0 G/l; CRP 18.8 mg/dl). Ultrasound examination showed no signs of haematoma. During the following 3 days, the patient still had fever of 38°C in the evenings and inflammatory parameter were just moderately decreasing, so the dosage of meropenem was escalated to 1,000 mg trice a day. Under this therapy, improvement in clinical symptoms, particularly abdominal pain and the normalisation of serological parameters, could be achieved. By the medical exit examination at the 8th puerperal day, moderate restitution of the uterus was detected. The patient was discharged on the 8th postoperative day and was referred to gynaecologist for further medical attendance and treatment.

Discussion

The *A. baumannii–A. calcoaceticus* complex is the species most commonly isolated from clinical specimens. It is ubiquitous in nature and has been found as part of the normal skin, throat and rectal flora as well as in food and body lice. It colonises patients in intensive-care units and contaminates inanimate hospital surfaces and devices as well as wounds, including war injuries. Although a frequent coloniser, *Acinetobacter* can be the cause of severe and sometimes lethal infections, mostly of nosocomial origin, predominantly ventilator-associated pneumonia. Bacteraemic infections are rare but may evolve to septic shock [5]. The increase in *A. baumannii* infections has paralleled the alarming development of resistance to antibiotics. In this case report, we present the case of *A. baumannii* infection during the pregnancy and puerperium in a patient treated in our hospital because of insufficiency of cervix which was diagnosed in the 28 + 3 week of gestation. To our knowledge, it is the first such report where vaginal colonisation of *A. baumanni* is thought to be the primary cause of premature contractions, chorioamnionitis and a subsequent postpartal septic incidence of the young mother. Interestingly, *A. baumanni* was only isolated from cervical swabs and not from normally sterile tissue (e.g. amniotic fluid or blood), suggesting that there is no real proof that *Acinetobacter* was actually causing true infection rather than just colonising. However, starting the treatment with meropenem might have been responsible for not culturing this bacterium in blood cultures. Moreover, if *A. baumannii* can lead to premature contractions and chorioamnionitis during the pregnancy, it is a very important issue for debate. In this case, several other bacteria have been isolated in cervical swab, which cannot induce premature contractions or a chorioamnionitis. Moreover, all the isolated bacteria were sensitive to the starting antibiotic treatment, except *A. baumanii*. Therefore, the opportunistic spreading of *A. baumanni*

without an adequate treatment might be the causative agent for premature contractions and even resulting in postpartal sepsis due to the large wound caused at the side of the placental adhesion.

The data of *A. baumanni* infections in obstetrics is rare. In Kandang Kerbau Hospital (Malaysia) between 1st January 1993 to 31st December 1995, all documented cases of septicaemia following caesarean deliveries were reviewed. There were 22 cases of septicaemia among 8,201 caesarean births, and hence the incidence was 2.7:1,000. Among the 22 documented cases of septicaemia only 2 infections with *A. baumannii* were identified. There was no mortality and prompt, vigorous treatment had led to uneventful recovery in all cases [6]. We can suppose that the recovery in our case also depended on the relatively prompt antibiotic therapy.

The emergence of multidrug-resistant (MDR) *A. baumannii* poses a therapeutic problem. In a recent study, evaluating the efficacy of ampicillin/sulbactam treatment of 94 nosocomial *A. baumannii* bloodstream infection (BSI) during the year 2000, 54% involved MDR strains, 81% of which were genetically related. Various risk factors for MDR *A. baumannii* were found, of which intensive-care unit admission and prior aminoglycoside therapy were independently associated with MDR *A. baumannii* acquisition. Of MDR *A. baumanii* BSI cases, 65% received ampicillin/sulbactam and 35% inadequate antibiotic therapy, whereas of 43 non-MDR cases, 86% were treated according to susceptibility and 14% inappropriately with antibiotics to which these organisms were resistant. Mortalities among patients treated adequately and inadequately were, respectively 41.4 and 91.7% ($P < 0{,}001$). Among severely ill patients, ampicillin/sulbactam therapy significantly decreased the risk of death ($P = 0.02$, OR = 7.64) [7].

At the University of Miami (USA), *A. baumannii* infection was identified in 271 patients, being resistant or intermediate-resistant to imipenem–cilastatin in 81.2% of these cases; 19.9% were resistant to all drugs except colistin, and two were resistant to all tested drugs. Interestingly, the recurrent infection after initial cure was found in 19.2% of patients. The investigators concluded that the majority of *A. baumannii* isolates were MDR and a significant proportion were sensitive only to colistin. Treatment of *A. baumannii* infection with colistin is effective by both intravenous and nebulized routes of administration. However, infection with *A. baumannii* in surgical patients is associated with a high mortality rate, particularly in transplant patients [8].

Although controversy remains, the pooled data suggest that infections by *A. baumannii* may be associated with considerable attributable mortality. Moreover, in cases of pneumonia and bacteraemia, inappropriate treatment is associated with, among other factors, mortality. The persistence of this organism in healthcare facilities, its inherent hardiness and its resistance to antibiotics results in it being a formidable emerging pathogen [4]. Therefore, treatment should be carefully considered [9]. Novel derivatives of cephalosporins, carbapenems, fluoroquinolones, or completely new antibiotic classes, of which several investigational drugs seem promising, may constitute the future of antibiotic therapy and hence the treatment of *Acinetobacter* infections [10].

To our knowledge, this is the first case where *A. baumannii* infection led to the premature contractions and chorioamnionitis during pregnancy. Early diagnosis and prompt initiation of appropriate antimicrobial treatment are necessary for a favourable prognosis. Considering *A. baumannii* infection as a special high risk because of physiological immune suppression and limited antibiotic treatment possibilities during pregnancy, we suggest initiating the therapy without delay as soon as the pregnant woman is being qualified as a risk group for chorioamnionitis. In light of the high morbidity and mortality associated with *A. baumannii* infection, we consider that an early and adequate treatment should be started to avoid maternal and neonatal complications.

Conflict of interest statement None.

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