CASE REPORT

LATE ONSET GROUP B β-HEMOLYTIC STREPTOCOCCUS INFECTION IN A NEONATE MANIFESTING AS A URINARY TRACT INFECTION: A RARE CLINICAL PRESENTATION

Z Zurina[1], A Rohani[2], V Neela[3] and O Norlijah[1]

[1]Department of Pediatics, [2]Departments of Obstetric and Gynecology, [3]Department of Medical Microbiology and Parasitology, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Selangor, Malaysia

Abstract. Group B β-hemolytic streptococcus (GBS) sepsis is a serious bacterial infection in neonates, with significant morbidity and mortality. We report here a neonate with late onset GBS infection manifesting as a urinary tract infection (UTI) in an infant presenting with prolonged neonatal jaundice. The pathogenesis of this late onset is postulated.

Keywords: group B β-hemolytic streptococcus (GBS), late-onset GBS disease, urinary tract infection (UTI)

INTRODUCTION

Group B β-hemolytic streptococcus (GBS) is an important cause of bacterial sepsis in newborns (Schelonka *et al*, 2005). Neonatal GBS infection is characterized as either early-onset (presenting within the first seven days of life) or late-onset disease (presenting between 7 days and 3 months of life). Early-onset disease often manifests as overwhelming sepsis, whereas late-onset disease usually presents as bacteremia or meningitis (Weisner *et al*, 2004; Schelonka *et al*, 2005; Phares *et al*, 2008). Late-onset GBS infection may rarely present as a focal infection, such as urinary tract infection (UTI) (Schelonka *et al*, 2005). We report a late onset case of GBS UTI in a neonate who presented with prolonged neonatal jaundice.

Correspondence: Dr Zurina Zainudin, Department of Pediatrics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.
Tel: +603 8947 2610; Fax: +603 8948 9369
E-mail: zurina@medic.upm.edu.my

CASE REPORT

An otherwise normal appearing newborn presented at day 22 of life with persistent jaundice. He was born at term to a 32-year-old woman via normal spontaneous vaginal delivery with a birth weight of 3.4 kg. The mother had routine prenatal care without a history of complications or risk for sepsis, such as a urinary tract infection, premature rupture of membranes or fever. The immediate post-natal period was uneventful and the mother and child went home 24 hours after delivery.

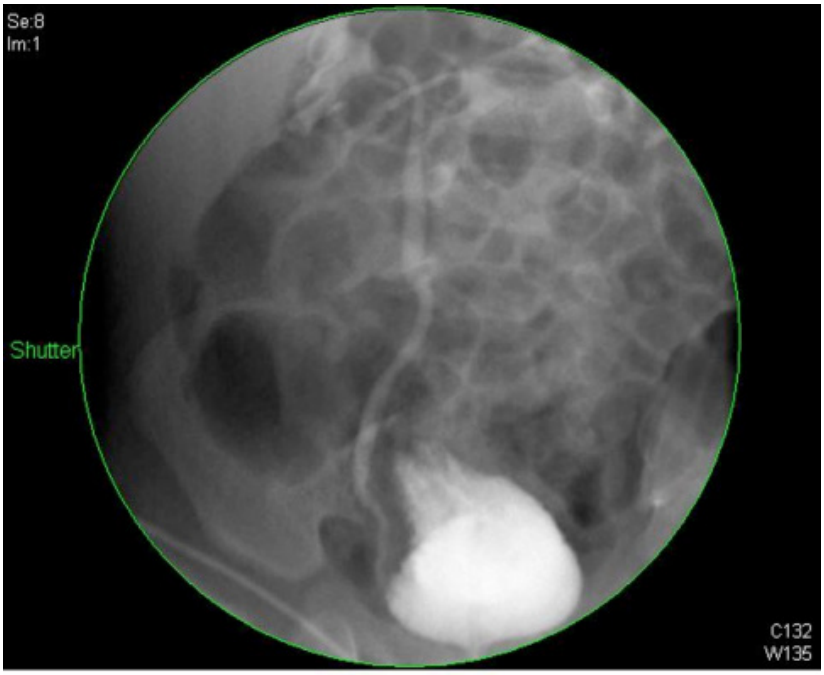

Fig 1–Micturating cystourogram demonstrated grade III vesicoureteric reflux involving the right renal collecting system.

On examination, the 22-day old neonate had slight jaundice on presentation to the hospital. The pulse rate was 127/min and the blood pressure was 109/49 mmHg. All peripheral pulses were normal and easily palpable. He had an oxygen saturation of 100% on room air. There was no chest deformity and the point of maximal impulse of the heart was palpable at the fifth intercostal space along the left midclavicular line. On cardiac auscultation, S1 and S2 were present and there was a non-radiating grade 3/6 pansystolic murmur best appreciated over the lower left sternal border. Abdominal examination revealed no organomegaly or palpable kidneys. He had normal uncircumcised male genitalia without hernia. The rest of the review of systems was unremarkable.

Initial testing revealed indirect hyperbilirubinemia (254 µmol/l) with a total bilirubin of 265 µmol/l. The child had normal hemoglobin level (12.1 g/dl), normal screening for glucose-6-phosphate dehydrogenase deficiency and a normal peripheral blood film making the possibility of hemolysis unlikely. The thyroid stimulating hormone and liver enzymes were normal except for a minimally elevated alkaline phosphatase level (373 U/l). Urine culture by suprapubic aspiration revealed GBS sensitive to penicillin, erythromycin and clindamycin. A phenotypically similar GBS was isolated from a maternal high vaginal swab.

The patient responded well to a one week course of intravenous penicillin and was discharged home with oral antibiotics. A follow-up repeat urine culture was sterile. Ultrasonography of the kidneys, ureter and bladder performed six weeks later showed mild separation of the left

pelvicalyceal system and micturating cystourography demonstrated a grade III vesicoureteric reflux involving the right renal collecting system (Fig 1). Echocardiography revealed the presence of a moderate size perimembranous ventricular septal defect.

DISCUSSION

The majority of infants presenting with persistent jaundice beyond 14 days of life have unconjugated hyperbilirubinemia. Although most of the time it is attributable to breast milk, it may also be the first sign of serious underlying pathology, such as hemolytic disease, hypothyroidism or a urinary tract infection (UTI) (Gracia and Nager, 2002; Pashapour *et al*, 2007; Banakar and Subbarayan, 2008).

Apart from unconjugated hyperbilirubinemia, the only significant abnormality found on initial investigation was the isolation of significant bacteriuria. The association between jaundice and UTI in neonates was first described by Görter and Lignac in 1928. The diagnosis of neonatal UTI is often difficult as the signs and symptoms are frequently non-specific and may be misleading, including fever, vomiting, diarrhea, lethargy, irritability, reduced feeding or poor weight gain (Schelonka *et al*, 2005). Not infrequently, a UTI presents as prolonged jaundice in an otherwise healthy infant (Gracia and Nager, 2002; Schelonka *et al*, 2005; Pashapour *et al*, 2007; Banakar and Subbarayan, 2008).

The growth of GBS instead of the usual gram-negative organisms from our patient's urine sample was unexpected. The most common uropathogen in neonates is *Escherichia coli* (Gracia and Nager, 2002; Cleper *et al*, 2004; Pashapour *et al*, 2007). Other gram-negative bacilli, such as *Klebsiella*, *Enterobacter* and *Proteus*, are a less frequent cause of neonatal UTI (Schelonka *et al*, 2005). Although GBS remains a major cause of sepsis and death in neonates, its isolation from the urinary tract at this age is rare. It is an uncommon manifestation of late-onset GBS infection (Schelonka *et al*, 2005).

Unlike early-onset GBS disease where infection results from either ascending spread of organisms into the amniotic fluid or acquisition of the organism during passage through the birth canal, the pathogenesis of late-onset disease is unknown. A previous study (Schuchat, 1998) found only 50% of mothers of infants with late-onset disease were found to carry the same GBS serotype as that causing infection in their infants; the source of infection in the other infants was unclear. It is postulated nosocomial and community sources maybe involved (Trager *et al*, 1996). In this case, it is likely the GBS bacteriuria originated from the mother since her vaginal swab grew a similar GBS phenotype. Unfortunately, further analysis was not performed due to technical reasons. The presence of vesicoureteric reflux predisposes the infant to infection; recurrent UTI can lead to renal growth retardation and insufficiency (Broyer *et al*, 1984).

The recognized serotypes of GBS are: Ia, Ib, Ic and II-VIII. Research in the 1970s suggest that serotype III isolates have distinctive features that contribute to causing meningitis and late-onset infection despite accounting for a smaller percentage of colonizing isolates (Baker and Barrett, 1974). More recent studies demonstrated the major role of serotype III in invasive neonatal GBS infection, especially in late-onset disease and meningitis (Weisner *et al*, 2004; Fluegge *et al*, 2005; Phares *et al*, 2008). Intrapartum chemoprophylaxis has

been proven to reduce the incidence of early-onset GBS disease, however the incidence of late-onset disease has remained unchanged (Schrag *et al*, 2002; Phares *et al*, 2008). A more definitive preventive measure against late onset neonatal GBS infection would be the development of a vaccine against the organism. Tracking the serotypes associated with GBS cases is important, since multivalent vaccines are being developed against the serotypes known to cause most invasive disease (Schuchat, 1998; Phares *et al*, 2008).

In conclusion, this case highlights the rare manifestation of late-onset GBS disease in neonates. It also points out cases of prolonged unconjugated jaundice warrant a careful assessment to avoid misdiagnosis of more serious underlying pathology, such as a UTI. Undetected UTI in neonates may lead to permanent renal damage and end stage renal failure (Broyer *et al*, 1984).

ACKNOWLEDGEMENTS

We thank Dr Elizawaty Othman and all the staff of pediatric ward 5B at Serdang Hospital for their assistance in the management of this patient.

REFERENCES

Baker CJ, Barrett FF. Group B streptococcal infections in infants.The importance of the various serotypes. *JAMA* 1974; 230: 1158-60.

Banakar MK, Subbarayan A. A study of prolonged jaundice screen in healthy term babies. *Indian J Clin Biochem* 2008; 23: 286-9.

Broyer M, Rizzoni G, Brunner FP, *et al*. Combined report on regular dialysis and transplantation of children in Europe, XIV. *Proc Eur Dial Transplant Assoc* 1984; 5: 55-79.

Cleper R, Krause I, Eisenstein B, Davidovits M. Prevalence of vesicoureteral reflux in neonatal urinary tract infection. *Clin Pediatr (Phila)* 2004; 43: 619-25.

Fluegge K, Supper S, Siedler A, Berner R. Serotype distribution of invasive group B streptococcal isolates in infants: Results from a Nationwide Active Laboratory Surveillance study over 2 years in Germany. *Clin Infect Dis* 2005; 40: 760-3.

Görter E, Lingnac GOE. Pyelitis complicated by jaundice. *Arch Dis Child* 1928; 3: 232-7.

Gracia FJ, Nager AL. Jaundice as an early diagnostic sign of urinary tract infection in infancy. *Pediatrics* 2002; 109: 846-51.

Pashapour N, Nikibahksh AA, Golmohammadlou S. Urinary tract infection in term neonates with prolonged jaundice. *Urol J* 2007; 4: 91-4.

Phares CR, Lynfield R, Farley MM, *et al*. Epidemiology of invasive group B streptococcal disease in the United States, 1999-2005. *JAMA* 2008; 299: 2056-65.

Schelonka RL, Freij BJ, Mcracken GH. Bacterial and fungal infections. In: Macdonald MG, Mullet MD, Seshia MMK, eds. Avery's neonatology: pathophysiology and management of the newborn. 6th ed. Philadelphia: Lippincott Williams & Wilkins, 2005: 1238-40.

Schrag S, Gorwitz R, Butts K, Schuchat A. Prevention of perinatal group B streptococcal disease. Revised guidelines from CDC. *MMWR Recomm Rep* 2002; 51(RR-11): 1-22.

Schuchat A. Epidemiology of group B streptococcal disease in the United States: shifting paradigms. *Clin Microbial Rev* 1998; 11: 497-513.

Trager JD, Martin JM, Barbadora K, Green M, Wald ER. Probable community acquisition of group B *Streptococcus* in an infant with late-onset disease: demonstration using field inversion gel electrophoresis. *Arch Pediatr Adolesc Med* 1996; 150: 766-8.

Weisner AM, Johnson AP, Lamagni TL, *et al*. Characterisation of group B streptococci recovered from infants with invasive disease in England and Wales. *Clin Infect Dis* 2004; 38: 1203-8.