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Case Series

Sepsis - Is it Really a Diagnosis? - Time to Deal with the "Elephant"

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Abstract

Objectives: The diagnosis of sepsis is used quite often in babies with no specific other diagnoses. Sepsis is the biggest cause of deaths in newborns all over the world. As per the latest NFHS-5 data in India - Sepsis accounts for over 50% neonatal deaths in India.

Methods: The author presents 3 different cases in his experience to explain the complexity of the diagnosis. We present 3 cases - with 3 different outcomes to explain, that sepsis per se is NOT a diagnosis - it is just incomplete without evidence in this modern world of Evidence Based Medicine (EBM).

Results: Is sepsis being over diagnosed? Is sepsis really so high - are we investigating them appropriately?

Conclusion: The diagnosis of sepsis should be restricted to babies with no other cause. Sepsis should be a diagnosis of exclusion. Any baby with sepsis - should have no other underlying cause like metabolic disease or some other pre-disposing conditions leading to sepsis as the terminal cause. Hence sepsis use should be restricted in neonates with proper evaluations to get an accurate estimation of the incidence.

Keywords: *Sepsis; Neonatal Septicaemia; Metabolic Disease*

Introduction

Sepsis is something of a nightmare for any parent of a premature infant or the neonatal pediatrician for that matter. In most countries it is supposed to be the commonest cause of death in neonates. We describe 3 cases to emphasise the need for proper evaluation before the diagnosis is applied.

Case Reports

Case 1

28+2/40 with a birth weight of 920 gms was born to a non-consanguineous couple - mother had mild GDM on OHA, went into prem labour and delivered a baby boy weighing 920 mgs, by NVD at a corporate hospital.

- APGARS were said to be 6 and 9 at 1 and 5 minutes respectively.
- Baby was ventilated for less than 24 hours with Insure - surfactant was given and then put on CPAP for 3 days.
- Feeds commenced on day 2.
- Baby became unwell on day 6, septic screen done and baby was commenced on meropenem.
- CRP was 69 and baby's blood culture grew *Klebsiella oxytoca*.
- Baby had been NBM during this period as there was tummy distension.
- Feeds recommenced on day 14.
- Day 19 baby was having apneas - septic screen showed CRP 149.
- Baby was commenced on Piptaz and amikacin.
- Baby started improving, blood culture grew *E. coli*.
- Feeds had been withheld for 72 hours during this illness for the fear of aspiration pneumonia.
- On day 28 baby became lethargic and septic screen was done - empirical amphotericin-B was commenced along with amikacin and meropenem.
- CRP was 103 and Blood culture grew *Klebsiella pneumoniae* with *Moraxella catarrhalis*.
- Sensitive to cefotaxime and resistant to amoxycillin.
- Antibiotics changed to cefotaxime……baby improved.
- Parents decided for DAMA from this corporate hospital on recovering while still on TPN and part feeds orally.
- Came to cloudnine on day 42.
- Baby looked bit unwell.
- We did routine bloods along with CRP. ALP was 678 IU/mL and CRP was 239.
- Started on Meropenem empirically and sent off the other investigations.
- Baby's blood culture was +ve for *Pseudomonas aeruginosa*.
- Baby died on 3rd day of admission with septic shock……
- But as per our policy we did newborn screening for the baby as it had not been done before. The results of the test came the morning the baby died - baby was positive for galactosaemia!! Parents were counselled regarding the same.

But parents were disappointed that the previous hospital had not done this "inexpensive" screening test despite baby being unwell so many times [1].

Case 2

Term baby was born by Em. LSCS at 2 AM @38+4/40 for CPD when presented in labour - though she was booked for LSCS at 39/40. Baby was born by LSCS and APGARS were said to be 9 and 10 at 1 and 5 minutes respectively. Baby was transferred to NICU as the baby required oxygen to keep the saturations above 90%. By 6 AM the nurse telephoned the consultant to check if she can start the baby on antibiotics as the baby was still requiring oxygen by 4 hours and not come out of oxygen. The consultant got angry and said, he has written the protocols and this baby was a cold LSCS and you "need not have woken me up" for this "silly question" at 6 AM! I will be there by 9 AM and will decide. The nurse documents the same thing in the baby's notes. 9 AM the consultant arrives at the hospital to see the baby was too sick and moribund. Subsequently the baby deteriorated fast and died at 11.45 AM - post mortem revealed baby's blood and organs

were streaming with *Streptococcus agalactiae* (Group B streptococcus) and the pathologist reported that the baby had died of Group B streptococcal sepsis.

Parents decided to sue the neonatologist for negligence. The hearing took some time and finally the Judge gave the option of removing the neonatologist from medical register or punishment by imprisonment - as he was too risky to be allowed to practice with so much of arrogance. The lawyer representing the neonatologist finally bargained and the neonatologist decided to change his speciality to biochemical pathology. The Judge gave consent - and the neonatologist is now has re-qualified and practicing as a pathologist [2].

Case 3

A woman aged 28 years and G2P1A0L0 came to us with the following history. Mom is a Biotech Engineer and Dad is a software Engineer. They had their first baby delivered in Kolkata by LSCS for presumed CPD. BW 3.20 Kgs. APGARS scores were said to be 8 and 9 at 1 and 5 minutes respectively, with no resuscitation required. Baby was being breastfed from birth with no other problems, was with the mother on bedside. Baby developed what appeared to be mild respiratory distress on day 2 - transferred to NICU. Monitored in NICU. Baby rapidly progressed to DIC and death on day 4. The treating hospital had the discharge diagnosis as Sepsis and cause of death explained to parents was Sepsis. Mom being a Biotech Engineer - was reluctant to accept the diagnosis and went against the hospital questioning the diagnosis and management. After a lengthy legal battle - the hospital was found guilty of not investigating the baby properly and was fined Rs. 2 lakhs.

The couple came to Bangalore to deliver their 2nd baby subsequently. She had an uneventful pregnancy. El. LSCS was planned at 39/40 in view of previous LSCS. Baby's BW 3.15 Kgs. APGARS were 9 and 10 respectively at 1 and 5 mins. Baby was with the mother. In view of the past history with the previous baby, at 24 hours of age baby was subjected to blood tests including CRP, serum ammonia, serum lactate and newborn screening for metabolic and other monoanalytes were done along with ABG - which revealed mild acidosis with a pH of 7.31, Ammonia level of 340 when the baby was shifted to NICU, though the baby was still asymptomatic at that stage. Over the next 24 hours, the ammonia level increased to 2400 though all the treatment protocols to decrease ammonia levels had been instituted and baby had been stopped breast and milk feeds altogether before it started coming down and normalised on day 4. The acidosis resolved with strict stoppage of protein component in feeds and treatment protocols to reduce ammonia.

The baby was managed with strict protocols for Citrullinaemia - the diagnosis of which was available by 48 hours of age and the baby recovered well to go home on day 6. Now the baby is 9 years and has had the liver transplantation at the age of 8 months - with the grandmother having donated the liver [3].

Discussion

Sepsis is not a diagnosis, but appears to be the pathway of events. It is clear from the 3 cases we have described that sepsis is a diagnosis of exclusion rather than a diagnosis.

In neonates, sepsis is a term used quite frequently and rather loosely with no evidence sometimes to prove the diagnosis or sometimes not realizing the underlying reason for such manifestations. This can lead to overdiagnosis of the problem and probably that's what accounts for >50% deaths being classified as sepsis in India in neonates [4].

It is highly important to use the appropriate biomarkers to identify babies with sepsis which are more accurate than just acute phase reactants which are non-specific, since the cultures take anywhere upto 72 hours and the gold standard of diagnosis is culture [5]. Newer

guidelines and consensus criteria for neonatal sepsis is overdue to ensure sepsis is used appropriately rather than loosely. Artificial Intelligence has been predicted to make a difference and probably play a role in early identification of babies with sepsis vs those who have metabolic decompensation due to other diagnosis [6,7].

Conclusion

The diagnosis of sepsis should be restricted to babies with no other cause. Sepsis should be a diagnosis of exclusion. Any baby with sepsis - should have no other underlying cause like metabolic disease or some other pre-disposing conditions leading to sepsis as the terminal cause. Hence sepsis use should be restricted in neonates with proper evaluations to get an accurate estimation of the incidence.

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