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A CLINICAL STUDY OF NEONATAL SEPSIS IN TERM & PRETERM WITH REFERENCE TO C-REACTIVE PROTEIN.

Pediatrics

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ABSTRACT

Introduction:- Neonatal sepsis is a prominent cause of death during the neonatal period. newborn sepsis is a leading cause of newborn morbidity and mortality worldwide. Developing countries account for more than 95% of infant deaths between the ages of 0 and 2 months. Creactive protein (CRP) is one of the most studied and widely used laboratory tests for neonatal sepsis. C-reactive protein is essential in the immune response to bacterial invasion. Its limited sensitivity during the early stages of disease is due to the delay in synthesis during the inflammatory respons **Method:-** During the period of October 2020 to September 2022, all neonates with suspected neonatal sepsis delivered in ANMMC Hospital and outside ANMMC Hospital were included in the study. **Outcome:** One hundred neonates were suspected of having neonatal septicemia. There were 16 occurrences of inborn babies and 84 cases of outborn babies. Birth weight, gestational age, mother's febrile sickness, and more than three viginal examinations. **Conclusion:** CRP has a high negative predictive value of 96-100% and can be utilised as a diagnostic of newborn sepsis to shorten antibiotic duration. During the period of October 2020 to September 2022, all neonates with suspected neonatal sepsis delivered in ANMMC Hospital and outside ANMMC Hospital were included in the study. **Conclusion:** CRP has a high negative predictive value of 96-100% and can be utilised as a diagnostic of newborn sepsis to shorten antibiotic duration.

KEYWORDS

Neonatals, C-Reactive Protein, Septicemia

INTRODUCTION:-

Septicemia is a leading cause of death during the Neonatal period. newborn sepsis is the leading cause of newborn morbidity and mortality worldwide.More than 95% of all babydeaths between the ages of 0 and 2 months occur in underdeveloped countries. It can lead to severe consequences such as meningitis and pneumonia, both of which have a high mortality and morbidity rate. Maternal factors, foetal variables, and interventions such as feeding practises can contribute to neonatal sepsis.

Early infection occurs between the ages of 0 and 3 days of life and is often the outcome of an infection caused by an organism acquired during pregnancy.

Late-onset infection occurs between the ages of 3 and 28 days of life and may involve bacteria, viruses, or other organisms that are commonly acquired postnatally.

There are very few methods of investigation in newborn sepsis. Blood culture results that are positive. Continue to be the gold standard for sepsis diagnosis. In symptomatic neonates, however, culture is typically negative. When blood cultures are negative, neonatal diagnosis and therapy must rely on other criteria. CRP is thought to be very sepcific for newborn sepsis in the absence of a positive blood culture.

In response to inflammatory cytokines Serum CRP, an acute phase reactant, is synthesised in the liver within 6-8 hours and can increase 1000 times. Because of the short half life of 19 hours, CRP levels should fall quickly after efficient removal of microbial stimulation. As a result, the CRP level may adequately reflect the individual. Balance of microorganisms and neonatal immune system.

There is evidence to support the use of serial CRP testing to diagnose or rule out sepsis.Sepsis diagnosis in a full-term or near-term infant. This study is being undertaken at ANMMC Hospital Gaya, Bihar, to examine the connection between CRP and blood culture in symptomatic term and preterm newborns with neonatal sepsis.

METERIAL & METHODS:-

Congenital and inborn infants are admitted to the NICU. The study was a one-year prospective study. Babies with clinical symptoms and indicators of probable neonatal sepsis were included in the study. Parents/attendants signed informed written consents. Each received an initial evaluation via history, examination of the neonate, and investigation. Antibiotic-treated neonates were excluded from the study.

Each infant was given a thorough history and physical examination. At the time of admission, a blood sample was collected and subjected to the following tests. Total leucocyte count (TLC), C-reactive protein (CRP), Micro-Esr, and gastric aspirate cytology for polymorphism (GAC). Blood samples for culture and sensitivity were taken at the same time. The decision to initiate antibiotic therapy was based on a mix of clinical symptoms, obstetric risk factors, and a sepsis screen.

Samples for blood culture and sensitivity were taken under stringent aseptic conditions. Gastric aspirate was transported to citology in a plain sterilised tube. TLC was measured by hand using a Neubauer chamber and an electric cell counter.

1. Gastric Aspiration for Polymorphs:

Gastric Aspiration was acquired via infant feeding tube within 24 hours of life and placed in plain vail. 1 drop was mixed with 1 drop of methyalene blue on a slide and covered with a coverslip. Polymorphs/HPF were observed on the slide using a microscope.

2. Micro ESR:

Micro ESR was evaluated in NiCu by filling a microhomatocrit tube with capillary blood and placing it vertically for 1 hour. Before measuring the distance from the top of the tube to the meniscus of the Red Blood Cell colum. The sample was collected in a 75mm long heparinised capillary tube with an internal diameter of 1.1mm and an exterior diameter of 1.5mm and was allowed to stand vertically, sealing the lower end of the capillary tube. A fal in a blood column in a capillary tube was measured after 1 hour. Result taken as mm fall in one hour

3. Blood Culture:-

A venipuncture blood culture sample was taken under aseptic conditions. Cleaning the skin with spiri. Betadin spirits, collecting it in a 2CC syringe, and transferring it to BCT/ ALERT. Using another needle, fill a 20ml bottle.

RESULT:-

From October 2020 to September 2022, 100 instances of newborn septicemia were studied.

1. Inborn/outborn distribution

IB/OB.	Number.	%.	P-value
Inborn.	16.	16%.	0.380
Outborn.	84.	84%.	
Total.	100.	100%	

2. Birth weight distribution

Birth weight.	Number.	%.	P-value
1-2.	17.	17%	0.001
2.1-3.	65.	65%.	
3.1-4.	16.	16%	
>4.	2.	2%	

Men+/-SD= 2.35+/- 0.64

3. Gastational Age in week

G.age in wk.	Number.	%.	P-value
<37wk.	37.	57%	0.001
>37wk.	43.	43%.	
Total.	100	100%	

Men+/- SD=36.73+/-2.09

4. Febrile illness in mother

Febrile illness of. Mother	Number.	%.	P-value
Yes.	15.	15%	0.389
No	85.	85%.	
Total.	100.	100%	

5. More than three vaginal examination

More than 3 vaginal. examination	Number	%.	P-value
Yes.	3.	3%	0.480
No.	97.	97%.	
Total.	100.	100%	

6. Pre Term labour

Pre Term labour. Yes.	Number. 4.	%. 4%.	P-value
No	96.	96%.	0.473
Total.	100.	100%	

DISCUSSION:-

Neonatal sepsis is the leading cause of illness and mortality in newborns. The incidence is substantially higher in underdeveloped countries. Early detection and treatment are the most effective ways to prevent morbidity and mortality. The main causes of high mortality are delays in diagnosis and treatment. Blood culture remains the gold standard for diagnosis. CRP's significance in newborn sepsis has been extensively researched among the various assays.

We previously observed a reduced CRP response to infection in preterm neonates compared to term newborns, with a poorer sensitivity (57% vs. 43%), lower median values (9 vs. 18.5 mg/l), and a lower area under the receiver operating characteristics curve (0.799 vs. 0.890). One fact could be the disparities in prenatal and postnatal care related more frequent preventive antibiotic treatment in preterm infants and their moms during birth. Another key issue is the timing of blood sample, which could be earlier in premature neonates. CRP is thought to play a key part in innate immunity as an early defence system against pathogens. As far as the endogenous immune response is concerned, CRP responses may be lower due to a less mature immunological system.

The validity of CRP in the diagnosis of sepsis was investigated in this study on 100 newborns. A total of one hundred instances of neonatal sepsis verified by blood culture were studied. The majority of the patients tested had the known risk factors and clinical signs of sepsis. CRP showed a sensitivity and specificity of 58.33% and 56.52%, respectively, according to one study. The test has a positive predictive value of 67.74% and a negative predictive value of 48.27%.

According to Benitz and colleagues[2,] the sensitivity of the test is only 40% when completed at presentation. In most cases, there is a 24-hour lag between the start of illness symptoms and the rise in serum CRP. When conducted 24 hours later, the sensitivity increases by up to 90%. The same effect was seen in a research by Mather NJ and colleagues [3], where sensitivity increased from 22% to 61% as time after admission increased.Given the high death rate associated with newborn sepsis, therapy is frequently commenced on suspicion of sepsis. CRP was found to be positive in 20 infants with culture negative instances in this investigation.

This could be owing to the administration of intrapartum antibiotics, which influenced the culture result. Because fatal infection has been reported in the presence of a negative blood culture, these neonates cannot be excluded from the study.[8] Similarly, newborns with intrapartum risk factors (oxytocin augmentation, epidural anaesthesia, maternal pyrexia, and meconium stained liquor) as well as clinical symptoms of sepsis were included. CRP levels are elevated in 50-90% of infants within six hours after the onset of bacteremia. Raised levels do not indicate bacterial infection.[9] Other circumstances in which CRP levels are elevated.Asphyxia, shock, intraventricular haemorrhage, surgery, and meconium aspiration are all concerns.

In the study, CRP was detected using a latex agglutination slide test. It is a simple, inexpensive, and widely available approach. The quantitative radio immuno diffusion method is another option. It is more specific, but it is also more expensive and time demanding. According to the study's findings, CRP is not a good screening test for early detection of sepsis, but it can be used as part of a grading system. This scoring system should incorporate hematologic data as well as clinical criteria. This would limit the inappropriate use of antibiotics on the one hand, and the delay in starting medication on the other.

CONCLUSION:-

1. Early onset of neonatal sepsis is more common than late onset of neonatal sepsis
2. Prematurity, low birth weight, near term, outside delivery, multiple time per-vaginal examination are predispose neonate to infection
3. Gram postive organism are common cause of early neonatal septicemia.
4. Sepsis screen is simple, cheap,less time consuming & easy to perform At bed side.
5. As an individual test C-reactive protein has highest sensitivity, specificity & positive predictive accuracy & is a sensitive response indicator of neonatal sepsis.
6. Combination of test increase the specificity & positive predictive accuracy.
7. Mortality is higher in pre Term & low birth weight neonates.
8. Mortality is higher in early onset of septicemia & gram negative septicemia.

Prevention:-

1. Intrauterine antibiotic prophylaxis
2. Use antiseptic solution to disinfect the birth canal
3. Simple infection control for mother
- Hand washing
- Promote clean deliveries
- Minimal per viginal examination
- Exclusive breast feeding

4. Prevention of infection in NICU
- Hand washing
- Universal precaution
- Minimal handling of baby Minimizing central venous catheter
- Continue monitoring & serveillanace of infection rate in NICU

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