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ROLE OF INTRAVENOUS IMMUNOGLOBULIN (IVIG) IN THE TREATMENT OF NEONATAL SEPSIS

Paediatric Medicine

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ABSTRACT

Introduction: One of the main causes of morbidity and mortality among preterms especially very low birth weight (VLBW) infants is neonatal sepsis. Even if antibiotic treatment started immediately, sometimes fails to prevent death; in such neonates immunity functions could be improved by administration of intravenous immunoglobulins. **Objectives:** The objective of our study was to evaluate the effect of intravenous immunoglobulin (IVIG) in neonatal sepsis. **Material and Methods:** We enrolled a total 80 patients, 40 in case and 40 in control group and evaluated the outcomes of both the groups in terms of mortality. **Results:** We found that *Escherichia coli* and *Klebsiella pneumoniae* were the most common pathogens isolated in positive blood culture cases of neonatal sepsis and there was no significant difference in the mortality rate in the adjuvant use of intravenous immunoglobulin in the treatment of neonatal sepsis. **Conclusion**: This study concludes that there is no significant difference in the mortality rate in the adjuvant use of intravenous immunoglobulin in the treatment of neonatal sepsis.

KEYWORDS

Preterms, Intravenous Immunoglobulin (IVIG), Neonatal Sepsis

INTRODUCTION:

One of the main causes of morbidity and mortality among preterms especially very low birth weight (VLBW) infants is Neonatal sepsis. Mortality can be as high as 50% in VLBW with septicemia. VLBW infants are prone to infections because of their immaturity immune system, immunoglobulins and complement deficiencies, invasive NICU practices and lack of maternal transplacental transport of IgG. Even if antibiotic treatment started immediately, sometimes fails to prevent death; in such neonates immunitary functions could be improved by administration of intravenous immunoglobulins.[1]

Maternal transport of immunoglobulins to the fetus mainly occurs after 32 weeks' gestation while endogenous synthesis begins several months after birth. Administration of intravenous immunoglobulin (IVIG) provides immunoglobulin G (IgG) that can bind to cell surface receptors, provide opsonic activity, activate complement, promote antibody-dependent cytotoxicity and improve neutrophilic chemo-luminescence. Theoretically, infectious morbidity and mortality could be reduced by the administration of IVIG.[2]

OBJECTIVES :

The prime objective of the study is to evaluate the effect of intravenous immunoglobulin (IVIG) in neonatal sepsis.

MATERIALS AND METHODS:

This study was conducted on neonates admitted in the NICU of Mata Gujri Memorial Medical College & L.S.K. Hospital in Kishanganj from Jan 2020 to Dec 2020 fulfilling the inclusion criteria after taking informed consent.

Inclusion criteria: The following neonates were included in the study:

a. neonates with proven sepsis (positive culture in blood, CSF)
b. Suspected sepsis in neonates having birth weight less than 1500 g
c. Suspected sepsis in neonates with positive septic screen

Exclusion criteria:

a. Neonates who had previously been administered intravenous immunoglobulin
b. Neonates with congenital malformations
c. Low APGAR score (<5) at birth
d. Severe asphyxia
e. Intraventricular hemorrhage

In this study we had 80 patients with proven or suspected sepsis; 40 of them received antibiotics (control) and 40 of them received antibiotic and IVIG as adjuvant therapy (case). IVIG was administered at the dose of 500 mg per kg body weight. Finally, we compared the outcomes of both the groups.

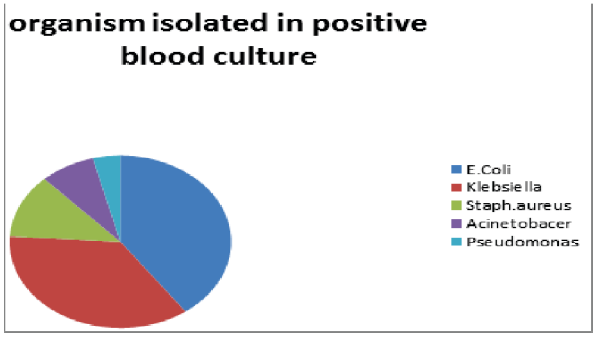
RESULTS

Total 80 patients were enrolled, 40 in case and 40 in control group. Main characteristics of enrolled neonates in case and control group is summarized in Table 1.

Table 1 : Main Characteristics Of Enrolled Neonates (n=80)

Variables	Case group (n=40)	Control group (n=40)	P value
Gestational Age (weeks)	32.8 ±1.8	32.52 ± 1.70	p>0.05 (not significant)
Birth Weight (kg)	1.50 ± 0.28	1.46 ± 0.27	p>0.05 (not significant)
Age (in days)	15.3 ± 4.0	15.3 ± 3.8	p>0.05 (not significant)
Cesarean Section	22 (55%)	23 (57.5%)	p>0.05 (not significant)
Blood culture	Positive in 13 case (32.5%)	Positive in 12 case (30%)	p>0.05 (not significant)
	Negative in 27 case (67.5 %)	Negative in 28 case (70 %)	p>0.05 (not significant)
CRP Positive	32 (80%)	31 (78.5%)	p>0.05 (not significant)

Of the 25 culture-positive neonates, 10 cases (40 %) had *Escherichia coli*, 9 cases (36 %) had *Klebsiella pneumoniae*. *Staphylococcus aureus* was found in 3 cases (12%) followed by *Acinetobacter* spp in 2 cases (8 %) . Only in 1 case (4 %) *Pseudomonas aeruginosa* was seen. The pattern of organisms isolated was similar in both the groups.



The outcomes of both the groups (case and control group) were compared in terms of mortality (i.e. death within 180 days from

treatment). Mortality rate were not significantly different between cases and controls (table 2)

Table 2: Mortality Of Enrolled Neonates (n=80)

Variables	Case group (n=40)	Control group (n=40)	P value
Total mortality	15(37.5%)	16 (40%)	p>0.05 (not significant)

DISCUSSION:

In our study both the study and control-groups were practically identical on sex, birth weight, gestational age, mean age, and clinical profile (p>0.05).

Escherichia coli and *Klebsiella pneumoniae* were the most common pathogens isolated in positive blood culture cases of neonatal sepsis ,as seen in developing countries.[3] However a recent study showed a changing trend in neonatal septic profile with predominance of gram positive organisms.[4]

In our study, there was no statistically significant difference between mortality rate in two groups (40% vs 37.5 % of control and case group, p >0.05). Several studies have shown varied results ,however most of the studies across the world showed no significant difference in mortality rate in cases of neonatal sepsis if intravenous immunoglobulin (IVIG) is given as an adjuvant therapy with antibiotics.[5-6] In 2010, a Cochrane metanalysis has demonstrated that intravenous immunoglobulins administration significantly reduce mortality in neonates with suspected or proven infection .[7] Recently, the INIS study, an international, placebo-controlled, multi-centre randomised trial that has enrolled 3493 infants and tested the adding of standard immunoglobulins (SIVIG) to antibiotic therapy in neonates with suspected infection showed that SIVIG had no effect on death.[8] In 2015, a Cochrane metanalysis has demonstrated that intravenous immunoglobulins administration as adjuvant therapy has no effect on mortality in neonates with suspected or proven infection.[2]

CONCLUSION:

This study concludes that there is no significant difference in the mortality rate in the adjuvant use of intravenous immunoglobulin in the treatment of neonatal sepsis.

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