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Prevalence and Antibiogram Profile of Neonatal Septicemia in Kirkuk Pediatric Hospital

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ABSTRACT:-

During period of Ten months, 200 cases of clinically suspected neonatal septicemia in Kirkuk city were included in this study. The aim of the study was to identify the causative agents of neonatal septicemia and their susceptibility to antibiotics. Blood culture was positive in 79 (39.5%) neonates, 50(63.3%) of them were males and 29(36.7%)were females. Out of 79 positive cases, 53(67.1%) had early-onset septicemia and 26(32.9%) had late-onset septicemia. Gram-negative bacteria were encountered in more than 90 % of these neonates. While gram-positive bacteria represented by *Staphylococcus aureus* were isolated from 5(6.3%) of neonates only. According to antibiotic susceptibility test it was found that the most effective drug was cefotaxime followed by ciprofloxacin and gentamicin. While most of the isolates were resistant to commonly used antibiotics like Amoxicillin, Ampicillin, Tetracyclin, and erythromycin.

انتشار ظاهرة تسمم الدم لدى الاطفال حديثي الولادة في مستشفى كركوك للاطفال

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المستخلص:-

خلال فترة عشرة اشهر تم زرع 200 عينة دم من حالات مشتبه باصابتها بتجرثم الدم لدى حديثي الولادة ، وكان الهدف هو معرفة اهم المسببات المرضية وحساسيتها للمضادات الحيوية. لقد كانت نتائج زرع الدم للاطفال ايجابية لدى 79 (39.5 %) من الحالات، وكان عدد الذكور 50(63.3 %) من الحالات الايجابية في حين بلغ عددالاناث 29 (36.7 %) منها. كان عدد الحالات التي شخصت كتجرثم دم مبكر هو53(67.1%) من الحالات الموجبة، وعدد الحالات المشخصة كتجرثم دم متأخر هو 26 (32.9 %). تبين من هه الدراسة أن الجراثيم السالبة لصبغة كرام كانت المسبب المرضي لدى اكثر من 90% من الحالات. بينما الجراثيم الموجبة لصبغة كرام المتمثلة بجرثومة المكورات العنقودية الذهبية عزلت من 5(6.3%) من الحالات فقط. من خلال فحص الحساسية للمضادات الحيوية تبين ان اكثر المضادات الحيوية فعالية تجاه الجراثيم المعزولة كانت cefotaxime يليهاciprofloxacin و gentamicin بينما كانت معظم العزلات مقاومة للمضادات الشائعة الاستخدام في المستشفيات مثل amoxicillin, tetracyclin, ampicillin, erythromycin.

INTRODUCTION:-

Neonatal septicemia describes any systemic bacterial infection documented by a positive blood culture during the first month of life. It is one of the most common reasons for admission to neonatal units in developing countries [1,2]. It is also a major cause of mortality in both developed and developing countries [3,4,5]. Neonatal septicemia usually divided into two types: Early-onset neonatal septicemia (EONS) and Late-onset neonatal septicemia (LONS). Early-onset septicemia is seen within the first 3 days of life and has a relatively high mortality rate between 15% and 50%. Late-onset septicemia starts after the first 3 days of life and may result in mortality rates up to 15% [6,7]. The spectrum of organisms that cause neonatal sepsis changes over time and varies from region to region. It can even vary from hospital to hospital in the same city. This is due to the changing pattern of antibiotic use and changes in lifestyle. Early-onset septicemia caused by organisms prevalent in the maternal genital tract or in the labour room and maternity operation theatre. It can occur due to ascending infection following rupture of membranes or during the passage of the baby through infected birth canal and at the time of resuscitation [8].

MATERIALS AND METHODS:-

The study was conducted in the Neonatal Intensive Care Unit at Kirkuk Pediatric Hospital in Kirkuk city from January 2006 to October 2006. The study included all neonates who were clinically suspected to

have neonatal septicemia as diagnosed by the physician in the hospitals with any features suggestive of sepsis. Neonates who received antibiotics were excluded from the study. The study includes a total of 200 cases of clinically suspected neonatal septicemia. One ml of blood was collected from each patient by vein puncture method. The blood samples were inoculated into 20 ml of Brain heart infusion broths (LAB M, UK) with 0.025% sodium polyanethol sulfonate as anticoagulant. The broths were incubated at 37 C° for 7 days. The broths were subcultured blindly after overnight incubation on chocolate agar (HIMEDIA, India), MacConkey agar (HIMEDIA, India) and 5 % sheep blood agar (HIMEDIA, India) by aseptically removing a few drops of well-mixed medium and spreading this inoculum onto the previous media. Culture negative bottles were followed up by examining the broth daily and doing a final subculture at the end of 7 days or at appearance of turbidity, whichever was earlier. Any growth was identified by colonial appearance characteristics and standard biochemical tests [9]. Antibiotic sensitivity test was performed for each isolate utilizing the method of Kirby-Bauer [10].

STATISTICAL ANALYSIS:-

Statistical analyses were performed using the Chi-square test and utilizing SPSS software. The level of significance was 0.95 with P-value < 0.05.

RESULTS:-

Blood culture were positive in 79(39.4)of the cases. Out of 79 septicemic neonates, 50(63.3%) of them were males and 29(36.7%) were females (Table 1). Fifty three (67.1%) had early-onset septicemia and 26(32.9%) had late-onset septicemia (Table 2). The assosciation beween sex and neonatal septicemia was significant ($p<0.01$). Also the assosciation between age group and neonatal septicemia was significant ($p<0.01$) using Chi square. The results of antibiotic sensitivity (Tables 3) revealed that the majority of the isolates were resistant to ampicillin, amoxicillin, erythromycin and tetracycline. The most effective drug was cefotaxime followed by ciprofloxaxin and gentamicin.

DISCUSSIONS:-

The data of the present study showed that neonatal septicemia was more frequent in male than females. This is in agreement with results found by other workers in Iraq [11,12,13]. The same result was found in Saudi Arabia [2, 14]. Reports from India and Pakistan also showed that male have been reported to be more likely than female to develop septicemia[15,16,17]. Such male preponderance suggests the possibility of sex-linked factor in host susceptibility [18]. Schaffer and Avery suggested that this difference was according to genetic hypothesis that concerns a gene locus on x-chromosome of human beings, which involved in the synthesis of immunoglobulines[19]. However, other authors suggested that male neonates were more susceptible to urinary tract infection and secondary sepsis due to the higher incidence of congenital anomalies of the urinary tract in the male than in female that caused the mentioned disease [20]. In this study , it was found that early-onset neonatal septicemia was more common than late-onset septicemia (Table 2). The same result found in Baghdad [11]، and in India[21]. Like other developing countries, the result of the study showed that gram negative organisms were the main causative agent responsible for neonatal septicemia. Similar result was found in Baghdad [12]. Also reports from India and Pakistan showed similar results [4,22,10]. The majority of bacterial isolates were found to be resistant to most of the commonly used antibiotics in Iraq. Similar results found in Baghdad, Libya, and in India [11, 23, 24]. This widespread resistance can be attributed to the lack of regular surveillance for antimicrobial susceptibilities, thus leading to indiscriminate and routine use of antibiotics in the neonatal care unit during the last decade. The most effective drug against pathogens isolated from septicemic neonates was cefotaxime followed by ciprofloxacin and gentamicin. Similar result found in Al-Anbar in Iraq [13] and Bangladesh [25]. According to the result of this study we recommend the physician to use cefotaxime or gentamicin as a first choice in the treatment of neonatal septicemia.

Table (1) Distribution of Neonatal Septicemia According to age (Onset of septicemia)

Organisms	Total isolates (%)	Onset of septicemia	
		Early-onset septicemia	Late-onset septicemia
E.coli	30(38%)	19	11
Klebsiella spp.	26(32.9%)	20	6
Proteus spp.	8(10.1%)	5	3
Pseudomonas spp.	6(7.6%)	5	1
Staphylococcus aureus	5(6.3%)	2	3
Enterobacter spp.	3(3.8%)	1	2
Citrobacter spp.	1(1.3%)	1	0
Total(%)	79(100%)	53(67.1%)	26(32.9%)

Table (2) Distribution of Neonatal Septicemia According to Sex

Organisms	Total No. of isolates (%)	Sex	
		Male	Female
E.coli	30(38%)	21	9
Klebsiella spp.	26(32.9%)	18	8
Proteus spp.	8(10.1%)	4	4
Pseudomonas spp.	6(7.6%)	4	2
Staphylococcus aureus	5(6.3%)	2	3
Enterobacter spp.	3(3.8%)	1	2
Citrobacter spp.	1(1.3%)	0	1
Total(%)	79(100%)	50(63.3%)	29(36.7%)

Table (3) Resistance Pattern of Bacteria Isolated from Neonatal Septicemia

Organisms	Total isolates (%)	Antibiotics								
		AMX	GM	E	Am	TOB	C	CIP	Te	CTX
E.coli	30(38%)	28	3	27	30	20	9	3	28	0
Klebsiella spp.	26(32.9%)	25	2	18	26	17	15	2	26	0
Proteus spp.	8(10.1%)	6	1	7	8	0	5	1	7	0
Pseudomonas spp.	6(7.6%)	6	1	6	6	3		0	6	0
Staphylococcus aureus	5(6.3%)	5	2	4	5	1	1	1		1
Enterobacter spp.	3(3.8%)	3	0	3	3	1	1	0	2	0
Citrobacter spp.	1(1.3%)	1	0	1	1	0	0	0	1	0

AMX:amoxycillin, GM:gentamicin, E:erythromycin, Am:ampicillin, CTX:cefotaxime, TOB:tobramicin, C:chloramphenicol, CIP:ciprofloxacin, Te:tetracycline.

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