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A Review of Outcome in Mothers with Sepsis in a Tertiary Referral Center in South India Coimbatore

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Abstract: ***Objectives**: To review various manifestations and evaluate the outcome of sepsis in mothers. **Materials & Methods**: This retrospective study was conducted from February 2019 - February 2020 in the maternity unit of Government Coimbatore medical college Hospital, Coimbatore. All mothers admitted in ICU and HDU with various manifestations of sepsis were evaluated from the case records of labour ward. **Results**: Totally 64 mothers were evaluated. Mothers with comorbid conditions and high SOFA score had poor outcome. They were intensively managed with higher antibiotics, blood transfusion, assisted ventilator support and evacuation of septic foci. **Conclusion**: Sepsis being 35% of total ICU admissions needs early interventions and management to prevent maternal mortality. Pre - existing comorbid conditions require an alteration in the endpoint of goals of resuscitation for successful resuscitation.*

Keywords: SOFA score, sepsis, outcome

1.Introduction

Maternal mortality is an indicator of the quality of obstetric care in a community directly reflecting the utilisation of health care services available. It differs from place to place, institute to institute reflecting the care provided and health status of the region. MMR (Maternal Mortality Rate) has been high in developing countries.

India's Maternal Mortality is 103 in 2017 - 2019 and in Tamilnadu - 60 in 2016 - 2018 and has decreased to 54 in 2021. Major complications that account for Maternal deaths are Haemorrhage, Preeclampsia and Sepsis. Hence our focus is on all three major causes. Of that Sepsis can rapidly progress to Septic Shock. Sepsis is preventable.

The current study is aimed at evaluating the spectrum of manifestations of sepsis in mothers of our institute.

2.Objective

The objective of the study is to determine the outcome of sepsis in obstetric patients admitted in the maternity wing of our institute in February 2019 - 2020.

3.Materials and Methods

The records in ICU and HDU were collected and analysed to find out various manifestations of sepsis in antenatal, postnatal, postabortal, postceasarean mothers. Out of 64 cases, the following data were collected - maternal age, parity, gestational age, comorbid conditions, SOFA score, mode of delivery, intensive management undergone and their outcome.

Though leucocytosis of pregnancy mimics sepsis and elevated C Reactive Protein validity is not that reliable as far as the diagnosis of sepsis is concerned, the fundamental foci of sepsis was searched for by doing the investigations like Blood culture &sensitivity, Urine culture &sensitivity, Pus culture & sensitivity, Ultrasonogram, CT Imaging, chest X ray, laboratory assessment of Renal functions, Liver functions, coagulation profile to assess the end organfunction. Collaboration between health care providers including Sub - specialty consultation as indicated, facilitated timely and effective clinical management.

4.Results and Analysis

Table 1: Distribution of Age in Sepsis

Age	Number of Cases	Percentage
<20	8	12.5%
21 - 30	42	65.6%
>30	14	21.8%

Table 1 shows extremes of age for 22 mothers due to un wanted pregnancies.65% of the total cases were between 21 to 30 years. This is probably because of active reproductive period of the women.

Table 2: Distribution of Parity in Sepsis

Gravida	Number of Cases	Percentage
PRIMIPAROUS	27	42.18%
MULTI	37	57.81%

Table 2 shows the distribution of parity in mothers with sepsis. Multi (58%) are more common than Primiparous (42%) probably due to low spacing and thereby decreased immunity.

Table 3: Sepsis and Delivery Status

Delivery Status	Number of Cases	Percentage
ANTENATAL	3	4.6%
POST ABORTAL	23	35%
POSTNATAL	14	21%
POST LSCS	24	37.5%

Table 3 shows distribution of sepsis according to delivery status. Sepsis was comparatively rare in antenatal mothers.3 out of 64 that is 4.6 % had sepsis. Ofthem two were in first trimester and one in second trimester.

Of the 14 Postnatal mothers, 11 were hospital deliveries and 3 home deliveries.

Of the 24 postoperative cases (37%) early post op was 17and 7 cases were beyond third POD.23 post abortal cases were there.

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Table 4: Comorbid Factors Associated with Sepsis

Comorbid Factor	Number of Cases	Percentage
ANEMIA	17	26.5%
GHT	5	7.8%
SEVERE PRE ECLAMPSIA	5	7.8%
AP ECLAMPSIA	1	1.5%
DIC	8	12.5%
GDM	2	3.1%
HEART DISEASE	1	1.5%
PPCM	2	3.1%
BRONCHIAL ASTHMA	1	1.5%
HYPOTHYROID	5	7.8%
PORTAL HYPERTENSION	1	1.5%
AKI	4	6.2%
IUD	5	13%

Table 4 shows the variables associated with sepsis. Anemia accounted for 26%. Hypertension contributed to 17% due to tissue hypoxia. AKI was associated in 6.2% of the cases, Coagulopathy in 12.5% cases. IUD was associated in 13% cases.

Table 5: Distribution of Sofa Score in Sepsis

Sofa Score	Number of Cases	Percentage
<3	18	28. %
>3 - 8	33	52%
>8	13	20%

Table 5 shows the distribution of SOFA score in septic patients. SOFA score more than 8 was associated with severe sepsis resulting in mortality

Table 6: Distribution of Management Modalities in Sepsis

Management Modalities	Number of Cases	Percentage
Artificial Ventilation	21	32.8%
Lapratomy	7	10'9%
Blood Transfusion	23	35.9%
Inotropes	5	7.8%
Antibiotics	64	100%

Table 6 shows the management in sepsis. Blood products transfusion was needed in 35.9% of the patients. Inotropic support was needed in7.8% of the cases. Assisted ventilator support was needed in 32.8%. Emergency laparotomy done in 10.9% of the patients. Only 12.5% cases needed higher antibiotics and hydration therapy alone.

Table 7: Sepsis and Maternal Death

Postabortal	9
Postceasarean	4
DIC	9
ANEMIA	2
CARDIOMYOPATHY	2

Table 7 showsout of 13 deaths 9 were postabortal and other 4 were post - ceasarean. DIC was there in 9 cases, anaemia in 2 cases and Cardiomyopathy in 2 cases.

Intestinal perforation was seen in 2 postabortal cases which ended in death due to peritonitis.

5.Discussion

Incidence of sepsis in pregnancy is 0.3%. Incidence of septic shock is estimated to be 1 in 8000.

Bacteremia occurs when bacteria enters bloodstream from a site of infection. Blood cultures are usually positive for the concerned pathogen during the bacteremic phase.

Sepsis is proven or probable infection with systemic manifestations.

Septic shock refers to sepsis related hypotension that persist in spite of adequate fluid replacement.

Sepsis syndrome is acontinuum consisting of initial phase of bacteremia followed by systemic inflammatory response (SIRS) in the host. Delay in treatment results in multiorgan dysfunction and death. Progression of septic shock is rapid.

Clinicalfeatures of alteration in body temperature (hypothermia/hyperthermia), chills, rigor, tachycardia or bradycardia, hypotension, tachypnoea and metabolic acidosis. Severe sepsis contained hypotension along with worsening oliguria, acute lung injury, worsening renal failure (serum creatinine >2mg/dl, serum bilirubin>2mg/dl, platelets<1, 00, 000/mm^3 and prothrombin time >1.5 INR)

Predisposing factors include pyelonephritis due to anatomical alterations of renal tract in pregnancy, endometritis in puerperium due to large area of denuded maternal tissues exposed to bacteria, septic abortion where inadequate evacuation of products provide nidus for bacterial proliferation, uterine perforation with peritonitis. Infection of surgical wounds (both ceasarean & episiotomy) where a breach in the skin is liable for bacterial contamination.

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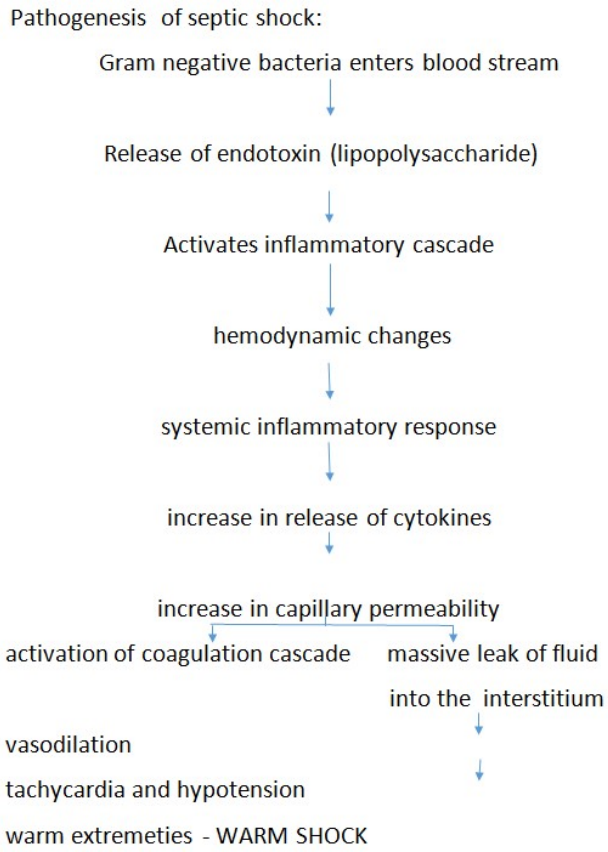

At this phase administration of Broad spectrum antibiotics and IVFluids is enough. If not, declining renal perfusion results in decreased urine output. Coagulation cascade gets activated and DIC AND Multiorgan failure ensues. Myocardial depression, damage of alveolar capillary membrane leads to exudation of fluids into lung resulting in ARDS. Early diagnosis is by suspicion. Outcome is critically dependant on early initiation of treatment. Hence spike of fever with hypotension should prompt early intervention.

The management consist of 3 pronged strategy which includes to initiate emergency goal directed treatment., identify the organism and the source of infection antibiotic therapy.

Emergency goal directed treatment includes initial resuscitation measures to achieve hemodynamic stability. Patient is to be shifted to ICU. IV access by central line started. Blood for CBC, Culture and Sensitivity, serum creatinine, electrolytes, LFT, RFT, PT, aPTT done. Bladder catheterised. Urine sent for culture and sensitivity.2 - 4 litres of normal saline infused rapidly to maintain a urine output of 30 - 50 ml/hour and CVP to be maintained at 8 - 10 cm H2O. Oxygen saturation maintained as SPO2>95%. In cases of failure to maintain SPO2, patient was intubated and ventilated. In case of non-response to IV fluids, pressor agents (noradrenaline) were started.

Goals of resuscitation included MAP>65mmHg, normalisation of tissue oxygenation, central venous or mixed venous O2saturation 70% or 65% respectively and normalisation of serum lactate. Pre - existing comorbidity requires an alteration of these end points and is important for successful resuscitation

Criteria for Sepsis Modified by SCCM 2016 Guidelines
SCCM: Society for Critical Case and Medicine

SOFA	0	1	2	3	4
Fio2	>400	<400	<300	<200	, <100
PLATELET	>150	<150	<100	, <50	<20
Sr. BILIRUBINN	<1.2	1.2 - 1.9	2 - 5.9	6 - 11.9	>12
CVS	NO HYPOTENSION	MAP<70mmHg	DOPAMINE<5	DOPAMINE >5	DOPAMINE>15
CNS	15	13 - 14	10 - 12	6 - 9	<6
RENAL	<1.2	1.2 - 1.9	2 - 3.4	3.5 - 4.9	>5

Others are APACHE – ACUTE PHYSIOLOGY AND CHRONIC HEALTH EVALUATION

SAPS - SIMPLIFIED ACUTE PHYSIOLOGY SCORE. These are the models to identify sepsis in ICU Patients.

Abdominal Compartment Syndrome:

Additional fluid resuscitation is based on ongoing assessment of fluid responsiveness. Excess crystalloid administration may worsen acute lung injury and edema and increase the risk of abdominal compartment syndrome. Patients with adequate fluid resuscitation with hypotension are benefitted by adding vasopressors namely norepinephrine which is the first drug of choice demonstrating the better return of splanchnic perfusion than any other agents. Inj. Epinephrine / Dobutamine are required in mothers with depressed cardiac function. Patients whose BP was poorly responsive to high dose of norepinephrine may be vasopressin deficient. Hence addition of vasopressin infusion at the rate of 0.03 unit/min and the response was determined by decline in norepinephrine dose. Due to the profound vasoconstriction effect of vasopressin, it should not be used as a first line agent.

Adrenal insufficiency may develop as a result of sepsis and a cause of inadequate response to vasopressor therapy to address this. Inj. Hydrocortisone 50 mg IV every 6 hourly was given.

All 13 cases of septic death were on assisted ventilator support with inotrope, that is they were in shock with MODS except 3 patients. Out of them one was AKI who was on Hemodialysis. Associated comorbid conditions were anaemia and GDM.

The second case was portal hypertension with ITP, a postabortal mother with DIC and renal failure on hemodialysis. After 8 cycles of hemodialysis the mother died.

Third case was sigmoid volvulus with Gestational hypertension. The patient reported with dyspnea and abdominal distension in whom diagnosis was made by CECT. Emergency laparotomy was done for the same.

Emergency laparotomy was done for 7 mothers. Out of them 3 were subacute intestinal obstruction, 1 was ileal perforation, the other was removal of products of conception from broad ligament. The remaining are Emergency appendicectomy and the last is the Intraperitoneal abscess drainage.

6.Conclusion

Though complications like septic shock for inotropic support, blood transfusion, venilatory support were dependant for 77% of sepsis mothers, mortality was associated for 20% only. Thus early intervention by early suspicion, early diagnosis by proper documentation of parameters such as hypotension, elevated serum lactate > 4 mmol/L marks the beginning of 6 hour initial resuscitation period which is essential for surviving sepsis campaign.

In our study of 64 mothers, there were 13 deaths. Of them 70% were post abortal. These deaths would have been prevented by avoiding unwanted pregnancies by proper spacing, adoption of contraception and sterilisation in multiparous women. On table counter of MMA drugs may be banned and the same should be provided only by Health care providers.

Pre-pregnancy counselling should be given for high risk women. Strict rules to be passed for ART to defer pregnancy in high risk women in whom pregnancy may endanger their life and termination of unwanted pregnancies under POCSO act to be done as early as possible.

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