ORIGINAL ARTICLE

Efficacy of Sepsis 6 Care Bundle in High Dependency Area of OBS in Reducing Maternal Morbidity and Mortality

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Abstract

Background: Sepsis is a leading cause of maternal death in the developed countries as well as underdeveloped countries where resources are very limited to deal. Due to sepsis the complication increases up to organ dysfunction. Sepsis 6 care bundle is a bundle of 6 necessary steps through which one can take out of danger and save the life of a severe sepsis patient.

Objective: To determine the efficacy of sepsis 6 care bundle in reducing maternal morbidity and mortality due to infectious cause in women admitted in High Dependency Area (HDA).

Material and Methods:

Setting: Descriptive, observational study in HDA, MCH, PIMS.

Duration: All obstetric patients admitted in high dependency area during the study period of January 2019 to March 2019. Confirmed sepsis cases from all 265 patients were screened. A self-designed data collection Performa was used to collect the necessary information. Diagnosed sever sepsis patients and sepsis shock patients were transferred to medical and surgical intensive care units.

Results: 60 diagnosed sepsis patients were separated after screening 265 patients admitted in HAD, MCH center PIMS. Out of 60 patients 15 with severe sepsis and 3 cases were diagnosed with sepsis shocks. The efficacy of sepsis 6 care bundles was not less than 46% with p value 0.039.

Conclusion: Sepsis 6 care bundle is effective to reduce the maternal morbidity of high risk obstetric sepsis patients.

Keywords: Six sepsis care bundle, maternal mortality, mortality in Obs. Patients, organ failure, Systemic Inflammatory Response Syndrome (SIRS).

INTRODUCTION

Sepsis is the clinical syndrome defined by the presence of both infection and the systemic inflammatory response syndrome (SIRS). When due to sepsis the complication increases up to organ dysfunction the sepsis called severe sepsis. Even in an era of modern antibiotics and advanced medical care, the incidence of sepsis has increased dramatically worldwide[1-3].

Sepsis is a leading cause of maternal death in the developed countries as well as underdeveloped countries where resources are very limited to deal. In UK 35% were died who were admitted with severe sepsis. Sepsis is the 11th leading cause of death in US. It is most expensive treatment condition in the hospital[3].

In Ireland ICD-10-AM (a diagnosis code for sepsis) analysis is used to estimate the incidence of sepsis. There is no second mechanism to record sepsis in community. The criteria of ICD-10-AM is not a good criteria as this code do not separate the cases of sepsis and infectious cases truly. So that in UK there may be underestimation of sepsis morbidity[4].

In 2003 USA, different experts revisited the guidelines of sepsis set by ACCP and SCCM in 1992 and observed that there is no evidence exists to change the definition of sepsis[5]. Similarly a study shows that MEWS score use to highlight the abnormalities in routine observations to separate the high risk patients from others. Patient information system is affective to audit MEWS score significantly[6].

International sepsis forum in 2001 presented a Delphi methodology for grading the recommendations from A to E with A being the highest grades, which is modified in 2004. These recommendations are used as guidelines for management of severe sepsis and sepsis shock[5]. The above guidelines are first revised under the forum of surviving sepsis campaign (SSC) in 2008 and then second time in 2012[7-8].

In surviving sepsis campaign 2008 some more steps added in management of sepsis and sepsis shock to prevent morbidity[9]. To prevent morbidity significantly, a complete team approach is required in which every person perform their role as his best and specifically including midwives, consultant obstetricians, consultant anesthetists, consultant hematologists, consultant intensivists and consultant microbiologists. To improve survival rates the 6 steps of care bundle be applied immediately or within 6 hours[9-10].

A study shows that a well implemented sepsis care bundle elements can reduced the mortality of severe sepsis and sepsis shock patients[11]. A quasi experimental study shows that 6 hours care bundle is more effective than 24 hours resuscitation bundle[12].

Australian Resuscitation In Sepsis Evaluation (ARISE) conducted a randomized control trial on the patients admitted in ED with early septic shock shows that Early Goal Directed Therapy (EGD) also did not reduce all roots who develop the morbidity in even after 90 days[13]. In a multinational study shows that mortality in sepsis patient is directly related to the time when the first antibiotic received. The study conclude that the every hour delay in first administration of antibiotic is increased the chance of morbidity in the patients[14].

Studies of maternal sepsis are also made more challenging due to the normal physiological changes of pregnancy, which overlap with some of the pathophysiological changes of sepsis. Currently, there has been no national level study of the incidence or risk factors for admission to critical care with severe maternal sepsis in the Pakistan. Therefore, we are conducted a study by applying sepsis 6 care bundles on high risk patients admitted in High dependency Area.

METHODOLOGY

This prospective observational study was conducted in high dependency area of MCH unit 1 in Jan–March 2019. The study was presented for approval from ethical committee of the MCH, PIMS hospital. Patients were enrolled after take consent from the patient himself or from their attendants. We include all suspected patients of sepsis indicated through sepsis screening tool (Attached). Patient's age, admission date, parity, infant sex, infant mortality, time since antibiotics take, lactate levels at admission, blood cultures, diagnosis comorbid and mortality were recorded through self-designed data collection proforma.. All cases of sepsis were treated according to sepsis tool i.e. proper investigations particular to diagnose sepsis which were serum lactate, blood culture and broad-spectrum antibiotics were started

within 24 hours of admission. Diagnosed sever sepsis patients and sepsis shock patients were transferred to medical and surgical intensive care units.

Statistical analysis: Data was entered and analyzed using SPSS version 23.0. Tables and charts were used to describe the results. Frequency, percentage and Mean, Standard deviation was used for descriptive analysis for qualitative as well as quantitative variables. To test the proportion of morbidity in sepsis patients in the population we have used one sample t test/binomial test. A p value ≤0.05 is considered as significant.

RESULTS

There were 265 pregnant women admitted in high dependency area. After screening through sepsis screening tool, we include 60 (22%) where sepsis confirmed. The mean age of 60 patients was observed 27.12±4.26 years with mean BMI was 26.09±2.53. Among 60 patients 35 were nulliparous, followed by 19 primiparous and the remaining 6 were multi parous.

Table1: Descriptive analysis of quantitative variables

Variable	Mean ± Standard deviation
Age	27.12±4.26
BMI	28.09±2.53
Time Since Antibiotic take	10.52±3.76
Lactate level	3.07±0.68
Duration of hospital stay	4.52±2.23

Blood culture was positive in most of the cases 58. The mean serum lactate level was 3.07±0.68 mmol/L. The average time since antibiotics intake was 10.52±3.76 hours. Out of 60 pregnancies, 32 infants were male while 28 female. 3 infants were died due to maternal severe morbidity. The average duration of hospital stay of 54 patients was 4.52±2.23 days. (Table 1 & 2)

Table 2: Descriptive analysis of qualitative variables of the study

Variables	categories	Frequency (Percentage)
BMI	Normal	4 (6.67)
	Overweight	50 (83.33)
	Obese	6 (10)
Parity	Nulliparous	35 (58.33)
	Primiparous	19 (31.67)
	Multiparous	6 (10)
Blood culture	Positive	58 (96.67)
	Negative	2 (3.33)
Infant sex	Male	32 (53.33)
	Female	28 (46.67)
Infant mortality	Death	3 (5)
	Alive	57 (95)

Out of 60 diagnosed sepsis patients 42 effected from sepsis, 15 from severe sepsis while septic shocks were examined in 3 patients. Total 18 cases were treated with sepsis 6 care bundles from which 6 were died. On the basis of our sample results we conclude that with sepsis 6 care bundle the mortality in sepsis patients is not greater than 54% with p value 0.044. (Table 3)

Table 3: Sepsis categories and respective vital status of patient after treated with sepsis 6 care bundles

Mortality	Severe sepsis	Sepsis shock	Total
Yes/Death	4 (26.67)	2 (66.67)	6 (33.33)
No/Alive	11 (73.33)	1 (33.33)	12 (66.67)
Total	15	3	18

We also identified the major cause of sepsis from which majority i.e. 50 % among the all cases diagnosed with sepsis in high dependency area were from eclampsia and pre-eclampsia. There were almost 30 cases referred from peripheral areas along with already comorbidities. There were total 11 (18.33%) cases of Dai handled among sepsis while 2 cases (3.3%) of women with severe sepsis had pneumonia/respiratory infection as the source of sepsis. (Table 4)

Table 4: Different cause of sepsis

variable	Sepsis	Severe sepsis/sepsis shock
Eclampsia	18 (30)	2 (11.11)
Pre-eclampsia	12 (20)	0
Dai handled	8 (13.33)	3 (16.67)
PPH	8 (13.33)	4 (22.22)
C. Hysterectomy	6 (10)	0
PPROM	6 (10)	0
MVA	4 (6.67)	0
PROM	4 (6.67)	4 (22.22)
Ruptured ectopic	4 (6.67)	0

*The above table is designed as the real information received from which a patient have suffered from more than one cause.

DISCUSSION

Severe sepsis and septic shock morbidity are common among pregnant and recently pregnant women admitted to intensive care unit. (1 in 7 and 1 in 9 obstetric intensive care unit admissions, respectively) in UK. The rate of maternal death from 'all-cause' maternal sepsis is substantially higher than that from genital tract sepsis alone (1.8/100 000 vs 0.5/100 000 maternities), and similar to the rate of maternal mortality from all infectious causes in the UK in 2009–2012 (2.0/100 000 maternities; 95% CI 1.6 to 2.6)[15].

In our study the sepsis 6 care bundle did not showed a better result which was expected when we start the study as 45% efficacy is not a bad but not a very good result. The reason behind this is that we do not analyze and note down the exact reason of death as some cases are seriously affected with other chronic diseases. A study also support our results in which the researchers conclude that sepsis 6 care bundle can be effective separately with a different ratio for men and women due to difference in sexual harmones[16-17].

We identified several findings with clinical and healthcare policy implications: eclampsia/pre-eclampsia was the leading (50%) source of sepsis; and there were major significant disparities in socioeconomic status and the risk of severe sepsis. There were total 11 (18.33%) cases of Dai handled among sepsis while 2 cases (3.3%) of women with severe sepsis had pneumonia/respiratory infection as the source of sepsis. While this finding supports that of the recent UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2009–2012, which found that 54% of all maternal sepsis deaths were caused by influenza (N=36; 43%) or pneumococcal disease (N=9; 11%)[18].

The average of our 60 diagnosed sepsis patients was 27.12±4.26 years. Maternal age is also a associated with sepsis morbidity and mortality and damage the efficacy of sepsis 6 care bundle treatment criteria as some previous studies shows that the maternal age, gestational birth and caesarian births are also some known risk factors for maternal sepsis[19-21].

CONCLUSION

On the basis of our study results it is suggested that sepsis 6 care bundle should be used in obstetric intensive care units to identify the patients with suspected sepsis and early interventions can reduce maternal morbidity as well as mortality.

Limitations: There were several limitations in this study. We have a limited time and financial resources so that we could not analyze and report the actual reason of death which are added up to death due to sepsis and showing the sepsis 6 care bundle technique inefficient. For this purpose a combined multi-disciplined research work would be planned so that the reason of death can monitor timely. Several comorbid were not observed i.e. mode of delivery, gestational age, knowing about infant sex, family issues (tensions), financial tensions, family history, history of chronic disease etc. which can more precise our findings.

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