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A STUDY OF COAGULATION PROFILE IN ICU ADMITTED PATIENTS WITH SEPTICEMIA IN A TERTIARY CARE HOSPITAL.

Pathology

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ABSTRACT

Coagulopathy is a common bleeding disorder in which the ability of blood to clot / coagulate is affected. There are various causes of coagulopathy among them sepsis or septic shock is the commonest among critically ill patients. It is evident that the coagulation system is commonly impaired among patients with sepsis as there is physiological interaction between coagulation and inflammatory mediators which results in morbidity. The present retrospective observational study aimed to study the coagulation profile in critically ill patients admitted in ICU with sepsis over a period of one year. The blood sample of a total of 120 samples were withdrawn in EDTA vials and in Sodium Citrate vials for evaluation of coagulation profile. It was observed that the majority of the patients were in the age group of 38-47 years (40.8%) and male predominance was found as the male to female ratio was 1.55:1. There was significant alteration in coagulation parameters ($P<0.005$). The study concluded that inflammation during sepsis / infection can lead to blood coagulopathy.

KEYWORDS

Infection, Coagulation profile, Clotting, Septicemia and Sepsis.

INTRODUCTION

The process of preventing and stopping the bleeding is known as hemostasis. The normal hemostasis comprises of four main components i.e. vasculature, platelets, coagulation factors and fibrinolytic proteins and any defect among these components results in coagulopathy.[1,2,3]

Coagulopathy is a common bleeding disorder in which the ability of blood to clot / coagulate is affected.[4] It is categorized as primary and secondary hemostasis disorder. The primary hemostasis disorder involves a defect among platelets and blood vessels, whereas, secondary disorder includes defects in clotting factors and their inhibitors.[5,6]

The literature suggests that the coagulopathy is a major cause of morbidity and mortality globally.[7] There are various causes of coagulopathy among them sepsis or septic shock is the commonest among critically ill patients. It is evident that the coagulation system is commonly impaired among patients with sepsis as there is physiological interaction between coagulation and inflammatory mediators which results in morbidity.[8,9,10]

The main characteristics of sepsis associated coagulopathy are prolonged INR and decreased platelets count which alter the coagulation process.[11,12]

Thus, the present study was undertaken to get insights into the pathogenesis of coagulation defects in critically ill patients with sepsis which helps the clinicians in minimizing the complications associated with coagulopathies
and better patient care management.

AIMS / OBJECTIVES OF STUDY

- To study the coagulation profile in critically ill patients admitted in ICU with sepsis.

MATERIAL AND METHODS

The present retrospective observational study was conducted in Government Medical College, Jammu and its associated hospitals over a period of one year from 1st January 2022 to 31st December 2022 after obtaining the ethical permission from institution.

Inclusion Criteria

- All the patients over 18 years of age with sepsis admitted in ICU of GMC, Jammu and its associated hospitals.

Exclusion Criteria

- All the patients less than 18 years of age and not meeting the criteria of SIRS (Systemic Inflammatory Response Syndrome).

A total of 120 patients clinically diagnosed with sepsis were involved in the study after obtaining the informed consent. The demographic variable were recorder and blood sample were also collected from all the patients in EDTA vials and in Sodium Citrate vials for evaluation of coagulation profile. The data was recorded in Microsoft Excel sheet and analyzed with SPSS version 21.0.

OBSERVATIONS AND RESULTS

Table 1 Age

Age (Years)	No.	%
18-27	9	7.5
28-37	30	25
38-47	49	40.8
48-57	12	10
58-67	17	14.1
68-77	3	2.5
>78	0	0

Table 1, shows that the majority of the patients were in the age group of 38-47 years (40.8%) followed by 28-37 years (25%), 58-67 years (14.1%), 48-57 years (10%), 18-27 years (7.5%) and 68-77 years (2.5%).

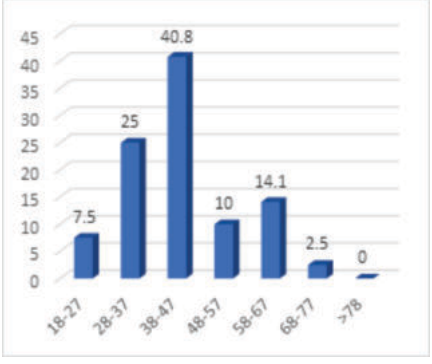

Figure 1-Age

Table 2 Gender

Gender	No.	%
Male	73	60.9
Female	47	39.1

Table 2, presented that there was male predominance as the most of the patients was male (60.9%). The male to female ratio was 1.55:1.

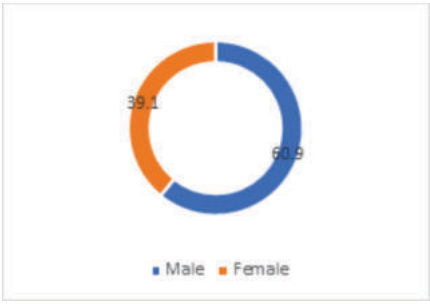

Figure 2- Gender

Table 3 Comorbidity

Comorbidity	No.	%
Diabetes	15	12.5
Cancer	4	3.33
CKD	17	14.16
Hypertension	21	17.5
Thyroid disorders	9	7.5
COPD	5	4.16

Table 3 depicted that out of 120 patients, 59.16% patients had comorbidities. The most common comorbidity among patients was hypertension (17.5%) followed by CKD (14.16%), diabetes (12.5%), thyroid disorders (7.5%), COPD (4.16%) and cancer (3.3%).

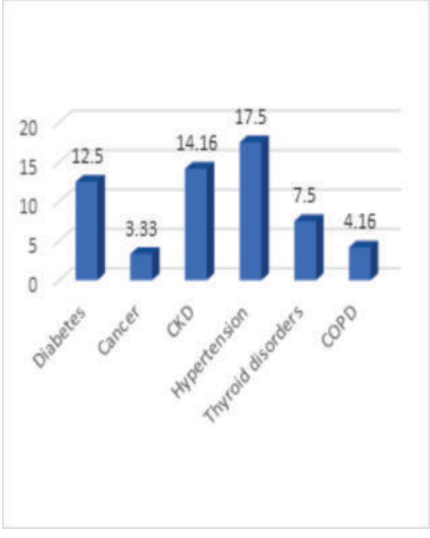

Figure 3- Comorbidity

Table 4 Isolated Microorganisms

Microorganisms	No.	%
Staphylococcus aureus	43	38.8
Streptococcus pyogenes	12	10
Klebsiella spp.	11	9.1
Escherichia coli	14	11.6
Pseudomonas aeruginosa	10	8.3
Streptococcus pneumoniae	29	24.1
Enterobacter aerogenes	1	0.8

In our study it was found that the most common isolated microorganism was staphylococcus aureus (38.8%) followed by Streptococcus pneumoniae (24.1%), E. coli (11.6%), Streptococcus pyogenes (10%), Klebsiella spp. (9.1%), Pseudomonas aeruginosa (8.3%) and Enterobacter aerogenes (0.8%) as shown in table 4.

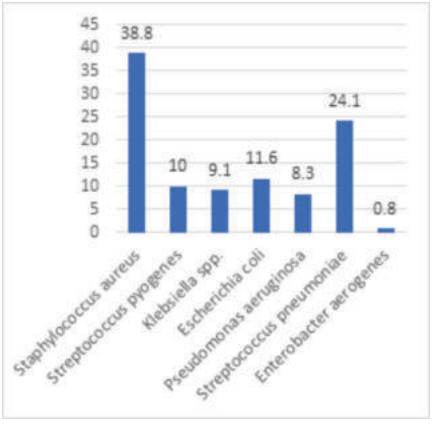

Figure 4 – Isolated Microorganisms

Table 5 Coagulation Parameters

Parameters	Mean±SD
APTT(s)	46.8±8.7
Prothrombin time (s)	16±3
INR	1.8±1.2
Platelet count (x109/l)	169±149
Fibrinogen (g/dl)	3.9±2.1
Fibrin-degradation products (µg/ml)	21±14
Thrombin time (s)	23±9
D Dimer(µg/ml)	4.15±3.1

Table 5 depicted the various coagulation parameters among patients with septicemia and there was significant alteration in coagulation parameters (P<0.005). The mean APTT(s) was 46.8±8.7, mean Prothrombin time (s) was 16±3, mean INR was 1.8±1.2, mean Platelet count (x109/l) was 169±149, mean Fibrinogen (g/dl) was 3.9±2.1, mean Fibrin-degradation products (µg/ml) was 21±14, mean Thrombin time (s) was 23±9 and mean D Dimer(µg/ml) was 4.15±3.1.

DISCUSSION

The present retrospective observational study evaluated the 120 patients with septicemia admitted in ICU. The data was analyzed and discussed with previously available data.

The literature suggests that the systemic inflammation leads to coagulation alteration and the main components of inflammatory-induced coagulation alteration are tissue factor, micro-particles, and platelets.[13,14]

In our study the majority of the patients were in the age group of 38-47 years (40.8%) and male predominance was found as the male to female ratio was 1.55:1. The findings of present study are correlated with the study conducted by Dagnew M et al., (2013), reported that the median age of the patients was 31.5 years.[15] In another study performed by Kim H. et al., (2018), found that the median age of the patients was 51 years and the majority of the patients were males.[16]

It was observed that out of 120 patients, 59.16% patients had comorbidities. The most common comorbidity among patients was hypertension (17.5%). The findings are comparable with the study carried out by Kim H. et al., (2018), reported that the most common comorbidity among all the study subjects was diabetes (32.4%) followed by hypertension (27%), cancer (8.1%) and CKD (2.7%).[16]

The most common isolated microorganism was staphylococcus aureus (38.8%) followed by Streptococcus pneumoniae (24.1%), E. coli (11.6%), Streptococcus pyogenes (10%), Klebsiella spp. (9.1%), Pseudomonas aeruginosa (8.3%) and Enterobacter aerogenes (0.8%). The observations are in accordance with the study conducted by Dagnew M et al., (2013), reported that the most common isolated microorganism was Staphylococcus (CONS) 30 (42.3%), followed by S. aureus 17 (23.9%) and Klebiesella spp. 9 (12.7%).[15] In similar study carried out by Kim H. et al., (2018), found that the most common involved microorganism was Klebsiella pneumoniae and methicillin-sensitive Staphylococcus aureus.[16]

There was significant alteration in coagulation parameters (P<0.005). The mean APTT(s) was 46.8±8.7, mean Prothrombin time (s) was

16±3, mean INR was 1.8±1.2, mean Platelet count (x109/l) was 169±149, mean Fibrinogen (g/dl) was 3.9±2.1, mean Fibrin-degradation products (µg/ml) was 21±14, mean Thrombin time (s) was 23±9 and mean D Dimer(µg/ml) was 4.15±3.1. These findings are similar to studies conducted by Dagnew M et al., (2013), Kim H. et al., (2018), Scarlatescu E et al., (2016), Tsao C-M et al., (2014), Ding Renyu et al., (2018) and Iba T et al., (2019) found that there was significant alterations in coagulation profile among patients with sepsis.[15,16,17,18,19,20]

CONCLUSION

This observational study concluded that the most common isolated microorganism was staphylococcus aureus and there was significant alteration in coagulation parameters among patients admitted in ICU with septicemia.

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