



RESEARCH ARTICLE

UTILITY OF SURGICAL APGAR SCORE TO PREDICT POSTOPERATIVE MORBIDITY AND MORTALITY IN LAPAROTOMY PATIENTS - A PROSPECTIVE STUDY

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Abstract

Background: This Ten-point Surgical Apgar Score also known as the SAS score predicts postoperative mortality and morbidity in patients undergoing laparotomy.

Method: 50 patients undergoing laparotomy surgery were enrolled. 42 of these were emergency surgeries for intestinal obstruction, perforation, peritonitis, subacute intestinal obstruction, penetrating injury, blunt injury to abdomen, ovarian cyst, etc. 8 cases were elective surgeries. The Surgical Apgar Score (SAS) was calculated intra-operatively based on estimated blood loss, lowest mean arterial pressure and lowest heart rate. Post-operative complications and mortality were recorded.

Results: In our study 10 out of 12 patients in the high-risk group developed complications. In other words, 83.34% developed complications. 7 out of 18 patients belonging to the medium-risk group developed complications which is 38.8%. Only 5 out of 20 patients in the low-risk group suffered from complications. 75% of the patients in the low-risk groups did not have any major complications following the surgery. This was statistically significant with a p-value of 0.04.

Conclusions: In our situation, laparotomy is still considerably high related with morbidity and mortality. The Surgical Apgar Score is excellent at classifying the postoperative risk of major complication following laparotomy using straightforward and highly varying intraoperative measurements. The SAS score alarms the surgeon and empowers him to take proactive action¹⁹.

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Introduction:-

One of the most frequently performed surgeries in general surgery is exploratory laparotomy. All surgical fields can utilize this 10-point Surgical Apgar Score, widely known as the SAS score, to determine postoperative mortality and morbidity¹.

Exploratory Laparotomy is one of the most common surgeries in general surgery practice. This Ten-point Surgical Apgar Score also known as the SAS score predicts postoperative mortality and morbidity and can be used in all specialties of surgery¹.

The Three important variables that were derived and formulated into the Surgical Apgar Score are the lowest heart rate, the lowest mean arterial pressure, and estimated blood loss during the surgery¹.

The SAS score provides an easy, quick, and objective means of estimating and communicating the patient outcome following surgery, using data that are routinely available even in low-resource settings. The score can be very useful in choosing patients at the higher- and lower-than-average likelihood of severe complications post-surgery and may help guide interventions to avoid poor outcomes².

The parameters of the score highlight the patient's overall condition

The Surgical Apgar Score was developed using three crucial factors: the lowest heart rate, the lowest mean arterial pressure, and the anticipated blood loss during the procedure¹. The SAS score uses data that are frequently accessible even in low-resource situations to give a simple, rapid, and objective way of evaluating and communicating the patient outcome following surgery. The score can be highly effective in selecting patients who are more and less likely than average to experience serious complications after surgery and may be useful in directing treatments to minimize undesirable outcomes². The factors that make up the score reflect the patient's underlying health.

Aim

The study aims to demonstrate the Surgical Apgar Score's applicability in post-operative risk categorization for morbidity and death within the first 30 days following laparotomy at tertiary hospitals.

Objectives Of The Study:-

1. To evaluate the percentage of laparotomy patients who experience significant symptoms 30 days after surgery.
2. To measure the 30-day postoperative mortality of laparotomy patients.
3. To establish a link between the Surgical Apgar Score and the occurrence of significant complications and mortality within 30 days of surgery.

Patients And Methods:-

The institutional ethics committee granted its clearance to a prospective, cross-sectional study and was conducted in a tertiary care facility.

Criteria For Inclusion:

1. Every patient who is older than 18 was scheduled for a mid-line laparotomy.
2. Senior resident rank and above operate.

Criteria For Exclusion:

1. Patients undertaking major surgeries on other parts of their bodies immediately or within 30 days of the laparotomy under study.
2. patients with tumors that have spread and were unresectable.
3. Patient in chemotherapy /immunocompromised state

Patients undergoing laparoscopic and mini-laparotomies. Every patient undergoing an emergency or elective laparotomy. Before engaging a person in the study, formal & informed consent will be sought from the patient. With the assistance of the PAC sheet, the proforma page is filled up within 24 hours of the actual surgery date. Three color-coded groups of patients were created, and every group was monitored up till the 30th postoperative day.

All patients who were discharged before thirty days had scheduled follow-up appointments at the outpatient clinic.

Results:-

After obtaining the necessary patient consent, Fifty patients who satisfied the inclusion criteria participated in the study. These 50 patients were accessible to track the results.

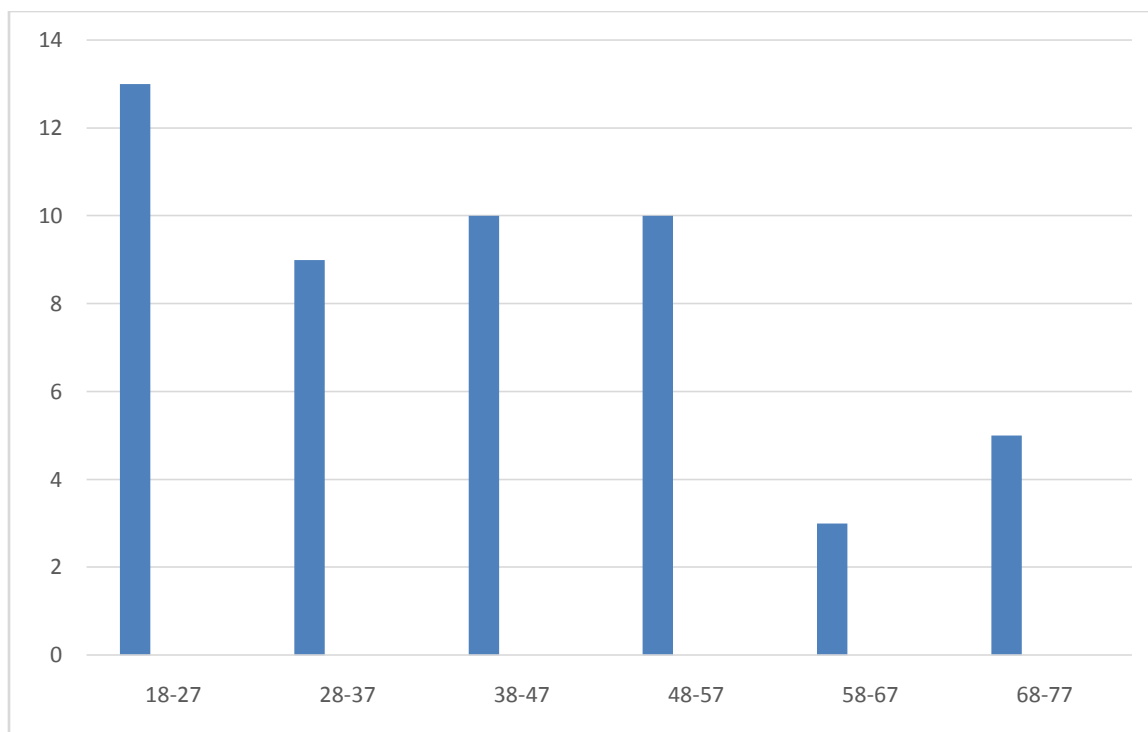


Fig 1:- Age Distribution.

The study population have 36 male and rest 14 female, which is 72 % predominantly to male and the remaining 28 % female

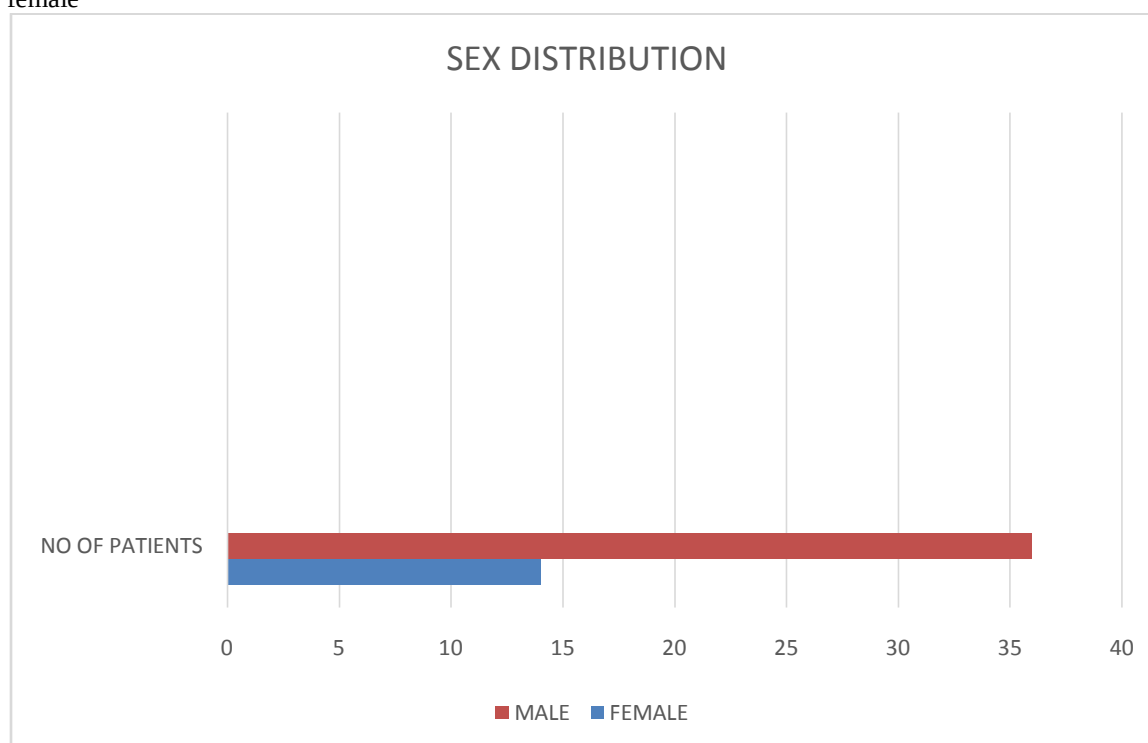
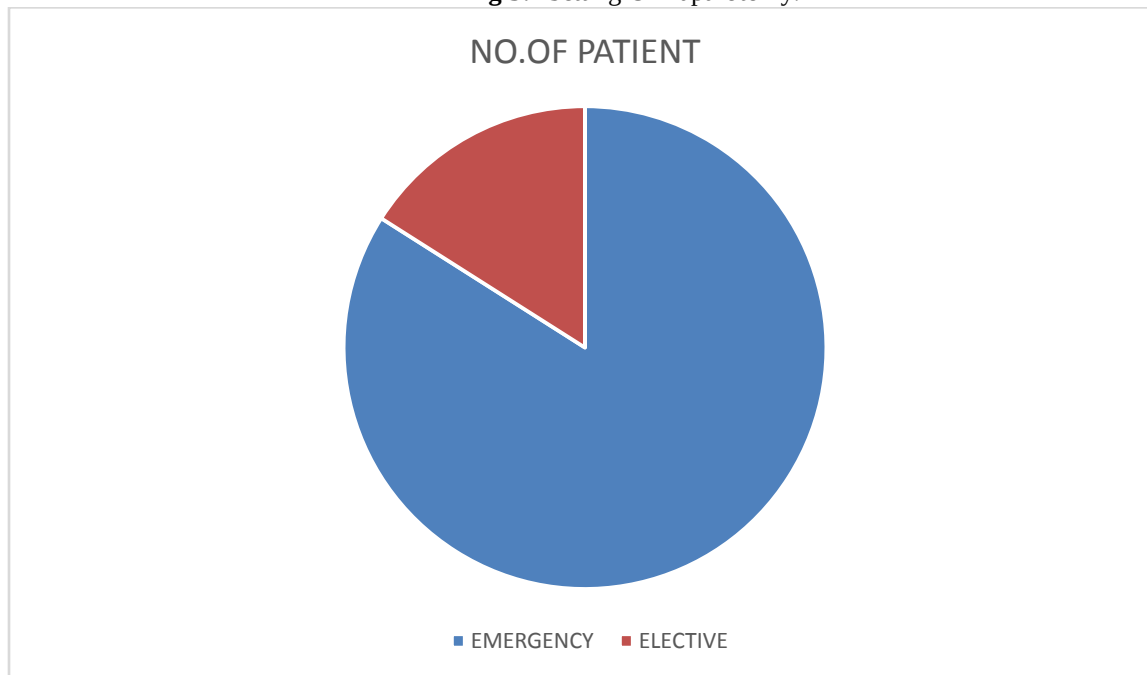


Fig 2:- Sex.

Fig 3:- Setting Of Laparotomy.

Risk group	Presence or Absence of complication		Total
	Absent	Present	
High risk	2	10	12
Medium risk	11	7	18
Low risk	15	5	20
Total			50

In the study population, there were 42 emergency cases and 8 elective cases.

FIG 4a: Indications for laparotomy

FIG 4b:- Indications for laparotomy.

DIAGNOSIS	NOS	PERCENTAGE
BLUNT INJURY TO ABDOMEN	2	4
INTESTINAL OBSTRUCTION	21	42
PERFORATION PERITONITIS	19	38
PENETRATING INJURY	3	6
SUBACUTE INTESTINAL OBSTRUCTION	4	8
OVARIAN CYST	1	2

COMPLICATIONS	FREQUENCY	PERCENT
No complications	28	56%
Anastomotic leakage	2	4%
Renal dysfunction	4	8%
Death	3	6%
Deep wound infection	4	8%
Respiratory infection	3	6%
Wound dehiscence	6	12%
TOTAL	50	100%

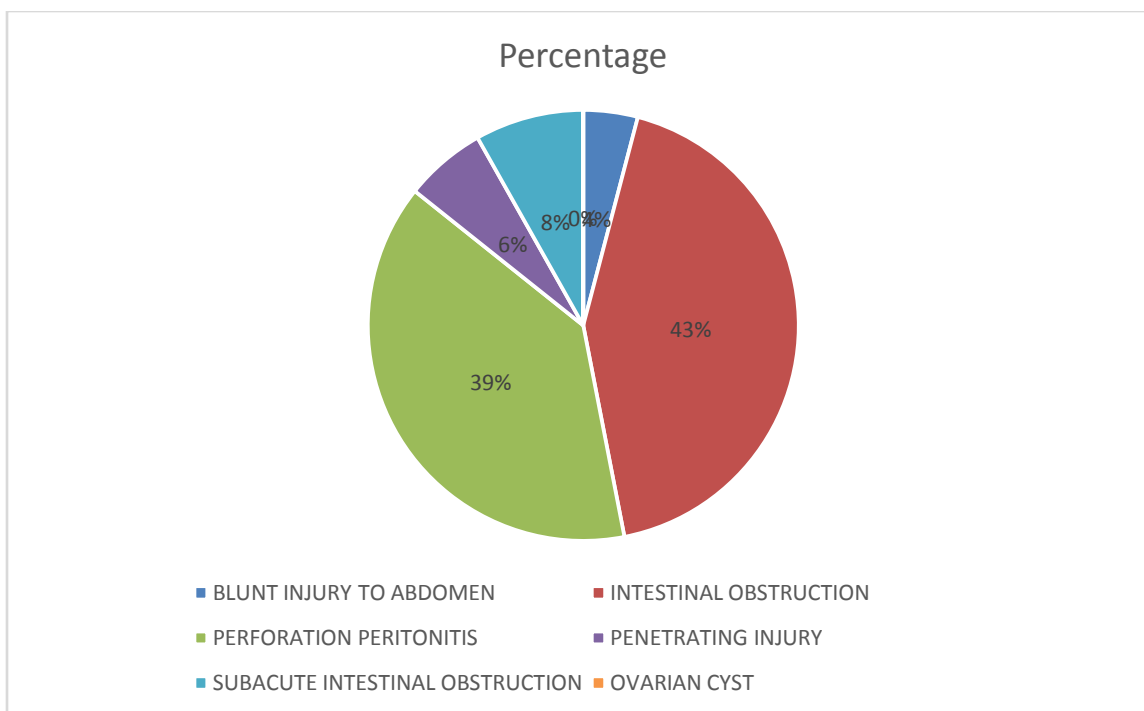


Fig 5a:-Complications.

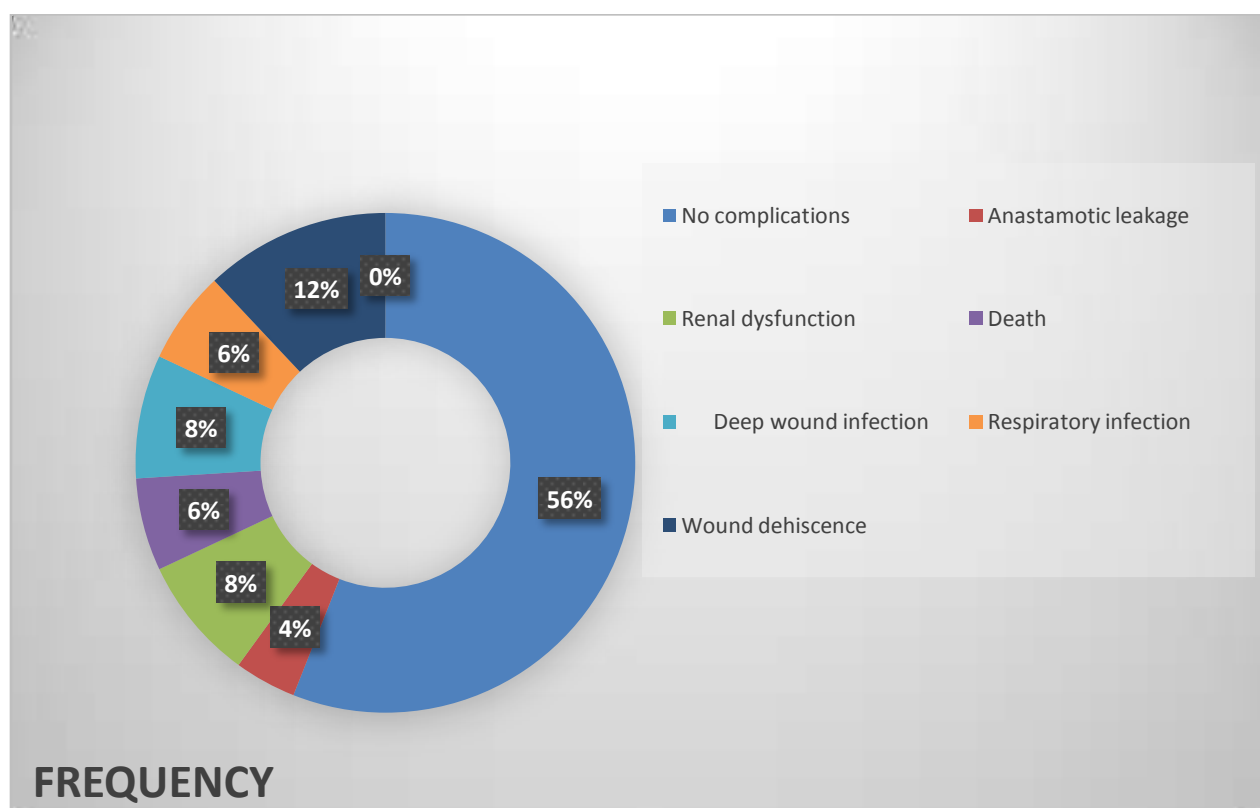


Fig 5b:-Complications.

According to SAS Score

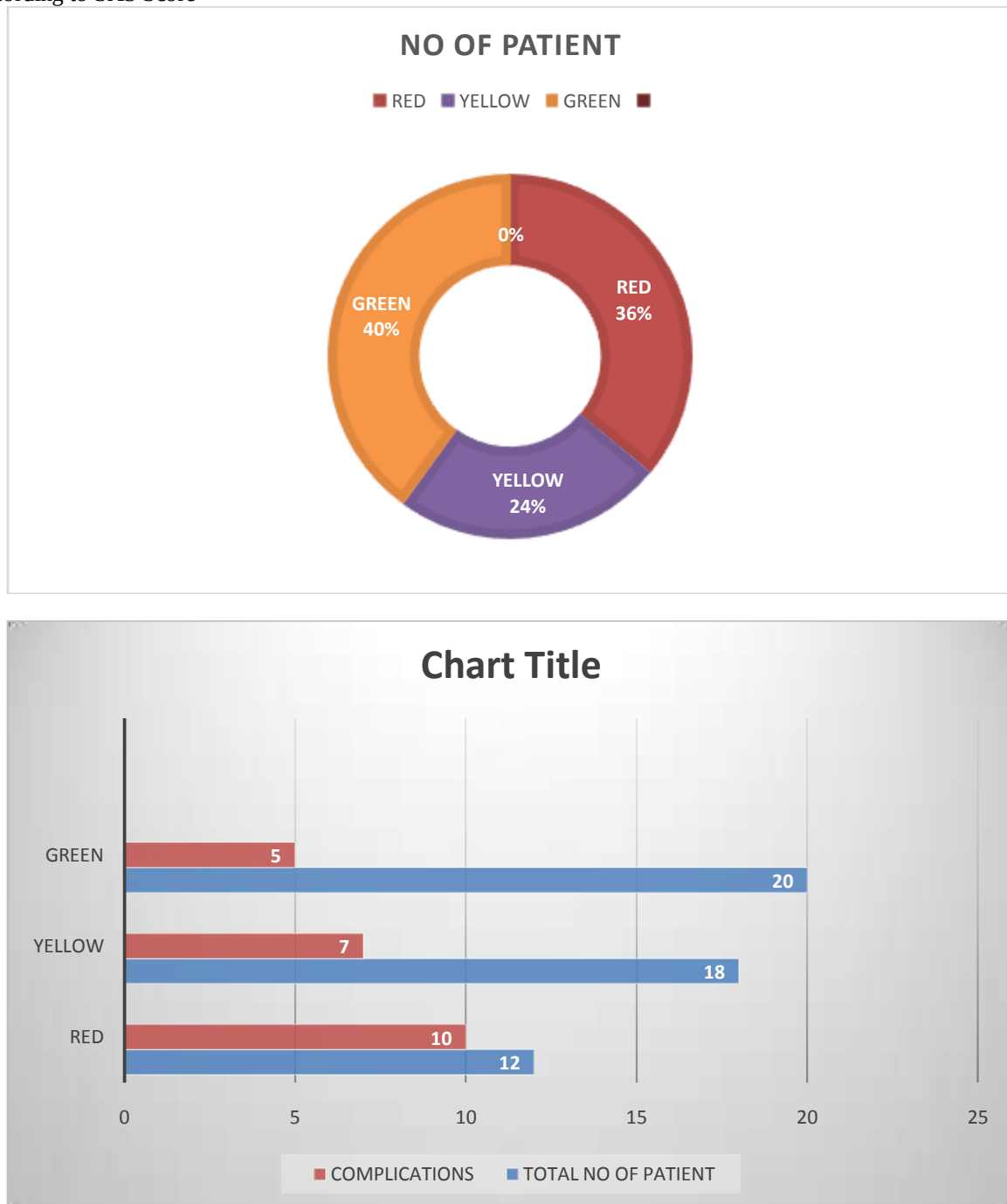


Fig 6:- Correlation Of Complication With Sas Score.

The high-risk group in our study experienced complications in 10 out of 12 participants. Alternatively put, 83.34% of the patients in the high-risk groups experienced problems. 38.8%, or 7 out of 18, of the patients in the medium-risk group, suffered problems. In the low-risk group, only 5 patients out of 20 experienced problems. Only 15% of patients in the low-risk groups experienced serious postoperative problems, compared to 75% of patients overall. Statistical significance was achieved here with a p-value of 0.04.

Discussion:-

An ideal surgical risk rating system would be straightforward, minimally complex in terms of calculations, data, and factors, reasonably accurate, objective, affordable, and applicable to both elective and emergency surgeries as well as all specialties. The SAS is an easy method to anticipate postoperative problems. Using just three variables, this straightforward grading system may accurately predict catastrophic postoperative effects².

In our study group, the median of these age groups was 39.5 years. The mean of the study group was 41.44 and the standard deviation was 16.50. This runs counter to research on SAS conducted in Western nations when it was discovered that patients undergoing laparotomies were generally substantially older. The study by Regenbogen et al. in 2009 found that the mean age was 64.2 years. Gawande et al study's indicated that the average age of the patient population was 63.6 years old.

The mean age was determined to be 64.2 years in the 2009 study by Regenbogen et al. According to studies by Gawande et al, the average age of the sample group was 63.6.

This study's 72% male preponderance is comparable to Mwangi et al.'s 67% male preponderance. The most frequent causes of laparotomy in our study were intestinal obstruction (42%), perforation peritonitis (38%), penetrating injury to the abdomen (6%), blunt abdominal injury (4%), and ovarian cyst (2%), whereas the most frequent causes in the study by Mwangi et al. in 2007 were peritonitis, intestinal obstruction, and appendicitis.

In our current study, mortality accounts for 6% of the total in the following 30 days post-surgery. This is found to be reasonably high when compared to studies by Mwangi et al. and Gawande et al. Additionally, it is comparable to Yii and Ng¹⁰. 4.8% of people died within 30 days, according to Mwangi et al. The 30-day mortality rate discovered by Yii and Ng was 6.1%¹⁰. Patients who underwent gastrectomy and a colectomy in the 2010 trial by Regenbogen and colleagues saw a mortality rate of 5.2%³. According to a 2007 study by Gawande et al., 4% of patients underwent colectomy.

	Present study	Mwangi study (%)	Yii&Ng(%)	Regenbogen	Gawande(%)
Mortality rate	6	4.8	6.1	5.2	4

The primary yardstick for the efficiency and ability of the surgeon and his team is the surgical mortality of the patients they are operating on. Surgical mortality is used as a substitute metric to assess their effectiveness. In our study, elderly participants had issues far more frequently. The fact that patients in our study who were older than 40 had a lower average Surgical Apgar Score serves to highlight it. This is in line with the findings of Regenbogen et al. (2009) and Gawande et al. (2007)^{3,7}, which reported that older patients had a higher incidence of postoperative problems.

In a Developing country like India, where there are few resources available, the SAS score would guide us to plan and manage the restricted resources for the post-operative care, monitoring, and follow-up of deserving high-risk patients.

The surgical Apgar Score also be implemented in surgical audits as an outcome of studies correlating surgical performance, intraoperative anesthesia, and the score. The SAS can be used to optimize performance if it is serially analyzed within a unit. However, more study is also essential in this domain across other surgical subspecialties.

Conclusion:-

In our situation, laparotomy is still considerably related to morbidity and mortality. The Surgical Apgar Score is excellent at classifying the postoperative risk of major complications following laparotomy despite using straightforward and highly varying intraoperative measurements. The SAS score alarms the surgeon and empowers him to take proactive action¹⁹.

Limitations

To determine the worth of the score, this study needs to be conducted on a larger scale over a longer span of time with a larger population.

Minor inaccuracies resulted from the inability to measure the precise amount of blood lost throughout the procedure.

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