e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2024; 16(10); 460-466

Original Research Article

Utility of Surgical Apgar Score in Predicting Morbidity and Mortality: A Prospective Study

Swagat Satpathy[1], Samarendra Satpathy[2], Pothula Yasodhara[3], Anshuman Vishwakarma[4], Mukti Prasad Mishra[5]

[1]Assistant Professor, DNB, Department of General Surgery, Jajati Keshari Medical College and Hospital, Jajpur, Odisha 755001

[2]Assistant Professor, MS, Department of General Surgery, Veer Surendra Sai Institute of Medical Sciences, Burla, Sambalpur, Odisha 768017

[3]Senior Resident 1st Year, MCH, Department of Plastic Surgery, Ballari Medical College and Research Institute, Ballari, Karnataka,583104

[4]Senior Resident, DNB, Department of General Surgery, All India Institute of Medical Sciences Raipur, Chhattisgarh 492099

[5]Assistant Professor, MS, Department General Surgery, Government Medical College (Jajati Keshari Medical College and Hospital), Jajpur, Odisha 755001

Received: 11-08-2024 / Revised: 18-9-2024 / Accepted: 18-10-2024

Corresponding Author: Dr. Mukti Prasad Mishra

Conflict of interest: Nil

Abstract

Introduction: Surgical outcomes are influenced by a variety of perioperative factors, and early identification of patients at high risk for postoperative complications is essential for improving care and survival rates. The Surgical Apgar Score (SAS), originally developed as a simple 10-point scoring system based on intraoperative blood loss, lowest heart rate, and lowest mean arterial pressure, provides a straightforward method for assessing the likelihood of postoperative morbidity and mortality. This prospective study aims to evaluate the utility of the SAS in predicting adverse surgical outcomes, including both morbidity and mortality, in a diverse patient population.

Aims: To assess the utility of surgical Apgar score in predicting morbidity and mortality in patients undergoing general surgery.

Materials and Methods: It was a Prospective Observational conducted one year at the department of Bokaro general hospital. 108 Patients were included in this study.

Results: We showed that In Normal Surgical Apgar score, all patients [35 (100.0%)] were Survived. In Mild Surgical Apgar score, all patients [28 (100.0%)] were Survived. In Moderate Surgical Apgar score, all patients [31 (100.0%)] were Survived. In Severe Surgical Apgar score, all patients [11 (100.0%)] were Survived. In Very Severe Surgical Apgar score, all patients [3 (100.0%)] were died. Association of Mortality with Surgical Apgar score Group was statistically significant ($p<0.0001$).

Conclusions: The Surgical Apgar Score is a reliable and practical tool for predicting postoperative morbidity and mortality. Its simplicity and ease of calculation make it a valuable adjunct in perioperative risk stratification, particularly in resource-limited settings. Incorporating SAS into routine surgical practice could facilitate early intervention strategies, potentially improving patient outcomes.

Keywords: Surgical Apgar Score, Morbidity, Mortality, Perioperative Risk, Postoperative Complications, Predictive Tool.

Introduction

A consistently low frequency of serious problems for patients undergoing any given procedure is the goal of hospitals and surgical teams. A crucial component of risk management in surgical practice is the prediction of complications. Identifying individuals who are more likely to experience complications during surgery will have a significant positive impact on both the surgical process and overall cost. Variations in the postoperative risk variables of patients typically result in considerable variability in the postoperative results. A straightforward model that may be used to predict complications in surgical patients should be able to be applied to any patient undergoing surgery. An accurate estimate of the occurrence of these issues is required for creating a predictive model for complications in surgical patients. Consequently, it's essential to define

complications correctly and have a low threshold for detection.

Numerous medical specialties conduct prognostic studies with the ultimate goal of gathering data that could one day be used to personalize or stratify care to improve patient outcomes. [1, 2, 3] There are numerous clinical risk grading methods in use in surgery. Their goal is to forecast the results of surgery. The American Society of Anesthesiologists (ASA) uses a widely accepted grading system. Its predictive value for individual patient outcomes, however, has been demonstrated to be minimal (negative predictive value 80%, positive predictive value 57% for complications). [4] Although there are other, more precise scores, including POSSUM (Physiological and Operative Severity Score for the enumeration of Mortality and Morbidity), they have not been incorporated into standard clinical practice because to their complexity. The surgical Apgar score (SAS), on the other hand, is a straightforward, cost-effective, and objective ten-point postoperative prognostic scoring system that is based on three easily recorded intraoperative variables: estimated blood loss, lowest heart rate, and lowest mean arterial pressure. After development in 2007 by Gawande et al. [5] A lower score on a scale of 0 to 10 indicates a worse prognosis. The score was originally verified in 4,119 patients undergoing general or vascular surgery, and it demonstrated a high link with the frequency of serious complications or mortality within 30 days of surgery. Since then, a number of other studies have externally verified the SAS in patients undergoing neurosurgery, orthopaedic and pancreatic surgery, gynecological, vascular, and general surgery. An extensive prospective multicenter trial spanning. In the largest study to date, the score was verified retrospectively in 101,907 patients from a wide range of surgical subspecialties in a single American center. The score was also validated in 5,909 people undergoing non-cardiac operations in 8 countries. But that applied solely to mortality. It has also been demonstrated that the SAS can predict problems that develop following a straightforward discharge from colorectal resection. On the other hand, the predictive usefulness of the SAS has not been proven by two research. [6, 7]

Materials and Methods

Study Design: This is hospital based Prospective Observational study to assess the utility of surgical Apgar score in predicting morbidity and mortality in patients undergoing general surgery.

Study Population: Study was conducted on population of about 108, aged between 15-75 years, who are undergoing general surgical procedures under general anaesthesia, spinal anaesthesia or epidural anaesthesia.

Study Place: Study place is conducted in Bokaro general hospital, a 910 bed tertiary care hospital in Bokaro steel city under Bokaro steel plant.

Source of Data: Total 108 randomly selected patients undergoing any general surgical procedures at Bokaro general hospital were included in the study. In view of non-availability of vascular procedures during the study period, vascular surgical procedures were not included in the study.

Inclusion Criteria: Patients undergoing emergency or elective general surgical procedures under general, epidural and spinal anaesthesia.

Post-operative patients requiring intensive perioperative monitoring in the age group of 15-75 years.

In both elective and emergency surgical procedures only major surgeries were included in the study. Surgeries included were:

Open appendecectomy in emergency, laparoscopic cholecystectomy, haemorrhoidectomy (milligan –morgan and stapler), fistulectomy, Modified Radical mastectomy, TAP, TEP, open cholecystectomy as an emergency, exploratory laparotomy and repair of perforation, colostomies and ileostomies, resection and anastomosis, Roux-en-Y gastrojejunostomies, total thyroidectomies with central node dissection, modified radical mastectomy, pyeloplasty, large incisional hernia repair, Inguinal herniorhaphy, inguinal hernioplasty ,small ventral hernias, simple mastectomy, open cystolithotomy.

Exclusion Criteria

- Surgeries under local anaesthesia, not requiring intensive monitoring and regular follow ups.
- Vascular surgeries as they are not performed in our set up

Various determinants such as age, sex, comorbid conditions, presenting disease procedures executed, the surgical Apgar score, the post op morbidity including complications till 30 days and the 30-day mortality were analysed.

Sample Size Justification: 50.

Statistical Analysis: For statistical analysis data were entered into a Microsoft excel spreadsheet and then analyzed by SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and Graph Pad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables.

Two- sample t-tests for a difference in mean involved independent samples or unpaired samples. Paired t-tests were a form of blocking and had

greater power than unpaired tests. One-way analysis of variance (one-way ANOVA) was a technique used to compare means of three or more samples for numerical data (using the F distribution). A chi-squared test ($\chi 2$ test) was any statistical hypothesis test wherein the sampling distribution of the test statistic is a chi-squared distribution when the null hypothesis is true. Without other qualification, 'chi-squared test' often is used as short for Pearson's chi-squared test. Unpaired proportions were compared by Chi-square test or Fischer's exact test, as appropriate.

Explicit expressions that can be used to carry out various t-tests are given below. In each case, the formula for a test statistic that either exactly follows or closely approximates a t-distribution under the null hypothesis is given. Also, the appropriate degrees of freedom are given in each case. Each of these statistics can be used to carry out either a one-tailed test or a two-tailed test.

Once a t value is determined, a p-value can be found using a table of values from Student's t-distribution. If the calculated p-value is below the threshold chosen for statistical significance (usually the 0.10, the 0.05, or 0.01 level), then the null hypothesis is rejected in favour of the alternative hypothesis.

p- Value ≤ 0.05 was considered for statistically significant.

Review of Literature

Table 1: Association between Surgical Apgar Score Group with all parameters

	Surgical APGAR Score Group							
Mortality		**Normal**	**Mild**	**Moderate**	**severe**	**Very Severe**	**Total**	**p-value**
	No	35	28	31	11	0	105	<0.0001
	Row %	33.3	26.7	29.5	10.5	0.0	100.0	
	Col %	100.0	100.0	100.0	100.0	0.0	97.2	
	Yes	0	0	0	0	3	3	
	Row %	0.0	0.0	0.0	0.0	100.0	100.0	
	Col %	0.0	0.0	0.0	0.0	100.0	2.8	
	TOTAL	35	28	31	11	3	108	
	Row %	32.4	25.9	28.7	10.2	2.8	100.0	
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	
Acute renal failure	No	35	28	31	8	2	104	<0.0001
	Row %	33.7	26.9	29.8	7.7	1.9	100.0	
	Col %	100.0	100.0	100.0	72.7	66.7	96.3	
	Yes	0	0	0	3	1	4	
	Row %	0.0	0.0	0.0	75.0	25.0	100.0	
	Col %	0.0	0.0	0.0	27.3	33.3	3.7	
	Total	35	28	31	11	3	108	
	Row %	32.4	25.9	28.7	10.2	2.8	100.0	
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	
Cardiac arrest	No	35	28	31	11	1	106	<0.0001
	Row %	33.0	26.4	29.2	10.4	0.9	100.0	
	Col %	100.0	100.0	100.0	100.0	33.3	98.1	
	Yes	0	0	0	0	2	2	
	Row %	0.0	0.0	0.0	0.0	100.0	100.0	
	Col %	0.0	0.0	0.0	0.0	66.7	1.9	
	Total	35	28	31	11	3	108	
	Row %	32.4	25.9	28.7	10.2	2.8	100.0	
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	
Myocardial infarction	No	35	28	31	10	3	107	0.0636
	Row %	32.7	26.2	29.0	9.3	2.8	100.0	
	Col %	100.0	100.0	100.0	90.9	100.0	99.1	
	Yes	0	0	0	1	0	1	
	Row %	0.0	0.0	0.0	100.0	0.0	100.0	
	Col %	0.0	0.0	0.0	9.1	0.0	0.9	
	Total	35	28	31	11	3	108	
	Row %	32.4	25.9	28.7	10.2	2.8	100.0	
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	
Pneumonia	No	35	28	29	10	3	105	0.2814
	Row %	33.3	26.7	27.6	9.5	2.9	100.0	

	Col %	100.0	100.0	93.5	90.9	100.0	97.2
	Yes	0	0	2	1	0	3
	Row %	0.0	0.0	66.7	33.3	0.0	100.0
	Col %	0.0	0.0	6.5	9.1	0.0	2.8
	TOTAL	35	28	31	11	3	108
	Row %	32.4	25.9	28.7	10.2	2.8	100.0
	Col %	100.0	100.0	100.0	100.0	100.0	100.0

Table: 2 Association between Stroke and Septic shock: Surgical Apgar score Group

		Normal	Mild	Moderate	Severe	Very Severe	Total	p-value
Stroke	No	35	28	30	10	3	106	0.3152
	Row %	33	26.4	28.3	9.4	2.8	100	
	Col %	100	100	96.8	90.9	100	98.1	
	Yes	0	0	1	1	0	2	
	Row %	0	0	50	50	0	100	
	Col %	0	0	3.2	9.1	0	1.9	
	Total	35	28	31	11	3	108	
	Row %	32.4	25.9	28.7	10.2	2.8	100	
	Col %	100	100	100	100	100	100	
Septic shock	No	35	28	31	11	0	105	<0.0001
	Row %	33.3	26.7	29.5	10.5	0.0	100.0	
	Col %	100.0	100.0	100.0	100.0	0.0	97.2	
	Yes	0	0	0	0	3	3	
	Row %	0.0	0.0	0.0	0.0	100.0	100.0	
	Col %	0.0	0.0	0.0	0.0	100.0	2.8	
	Total	35	28	31	11	3	108	
	Row %	32.4	25.9	28.7	10.2	2.8	100.0	
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	

Table 3: Distribution of mean Surgical Apgar score and Duration of hospital stay in Days: Surgical Apgar score Group

		Number	Mean	SD	Minimum	Maximum	Median	p-value
Surgical Apgar score	Normal	35	9.4000	0.4971	9.0000	10.0000	9.0000	
	Mild	28	7.4286	0.5040	7.0000	8.0000	7.0000	
	Moderate	31	5.4194	0.5016	5.0000	6.0000	5.0000	
	severe	11	3.3636	0.5045	3.0000	4.0000	3.0000	
	Very Severe	3	0.6667	0.5774	0.0000	1.0000	1.0000	<0.0001
Duration of hospital stay in Days	Normal	35	8.7143	2.0375	5.0000	16.0000	9.0000	0.8621
	Mild	28	8.7857	2.9859	5.0000	20.0000	8.0000	
	Moderate	31	9.0968	2.9705	5.0000	21.0000	9.0000	
	severe	11	9.2727	2.1950	5.0000	12.0000	9.0000	
	Very Severe	3	7.6667	1.5275	6.0000	9.0000	8.0000	

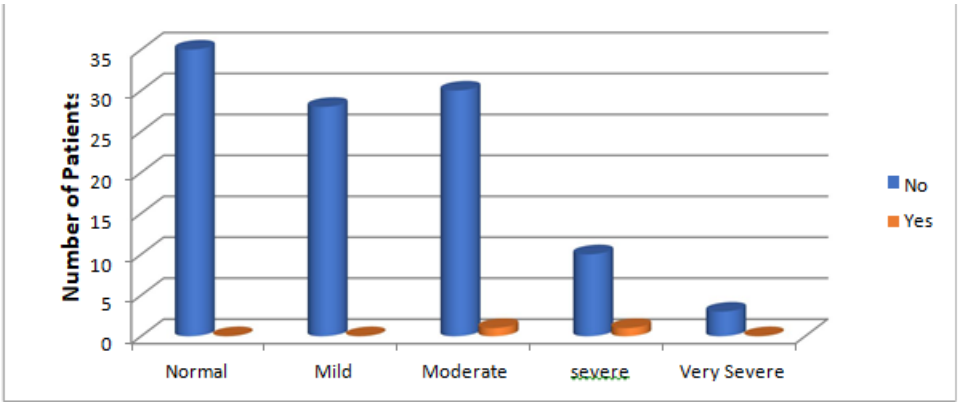

Figure 1: Association between Stroke: Surgical Apgar score Group

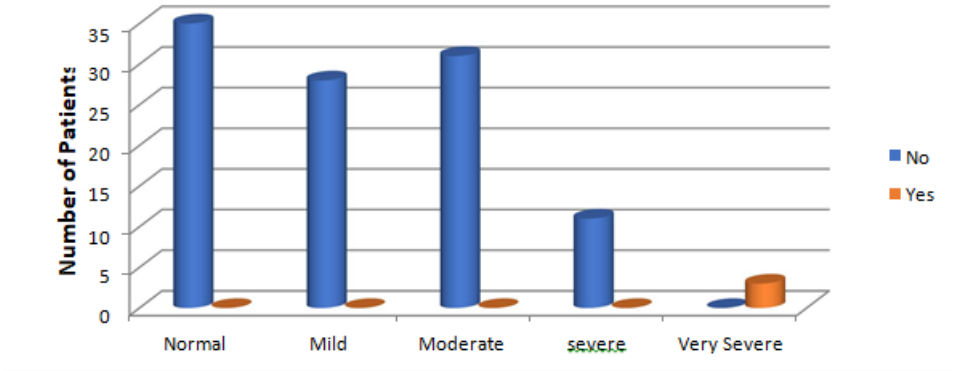

Figure 2: Association between Systemic inflammatory response syndrome: Surgical Apgar score Group

In Normal Surgical Apgar score, all patients [35 (100.0%)] were Survived. In Mild Surgical Apgar score, all patients [28 (100.0%)] were Survived. In Moderate Surgical Apgar score, all patients [31 (100.0%)] were Survived. In Severe Surgical Apgar score, all patients [11 (100.0%)] were Survived. In Very Severe Surgical Apgar score, all patients [3 (100.0%)] were died. Association of Mortality with Surgical Apgar score Group was statistically significant (p<0.0001).

In Severe Surgical Apgar score, 3 (27.3%) patients had acute renal failure. In Very Severe Surgical Apgar score, 1 (33.3%) patient had acute renal failure. Association of Acute renal failure with Surgical Apgar score Group was statistically significant (p<0.0001). In Very Severe Surgical Apgar score, 2 (66.7%) patients had Cardiac arrest. Association of Transfusion required with Surgical Apgar score Group was statistically significant (p<0.0001). In Severe Surgical Apgar score, 1 (9.1%) patients had Myocardial infarction. Association of Myocardial infarction with Surgical Apgar score Group was not statistically significant (p=0.0636).

In Moderate Surgical Apgar score, 2 (6.5%) patients had Pneumonia. In Severe Surgical Apgar score, 1 (9.1%) patient had Pneumonia. Association of Pneumonia with Surgical Apgar score Group was not statistically significant (p=0.2814)

In Very Severe Surgical Apgar score, all patients [3 (100.0%)] had Septic shock. Association of Septic shock with Surgical Apgar score Group was statistically significant (p<0.0001).

In Normal Surgical Apgar score, the mean Surgical Apgar score (mean± s.d.) of patients was 9.4000 ± 0.4971. In Mild Surgical Apgar score, the mean Surgical Apgar score (mean± s.d.) of patients was 7.4286± 0.5040. In Moderate Surgical Apgar score, the mean Surgical Apgar score (mean± s.d.) of patients was 5.4194 ± 0.5016. In severe Surgical Apgar score, the mean Surgical Apgar score (mean± s.d.) of patients was 3.3636 ± 0.5045. In Very Severe Surgical Apgar score, the mean Surgical Apgar score (mean± s.d.) of patients was 0.6667 ± 0.5774. Distribution of mean Surgical Apgar score with Surgical Apgar score Group was statistically significant (p<0.0001).

In Normal Surgical Apgar score, the mean Duration of hospital stay in Days (mean± s.d.) of patients was 8.7143± 2.0375. In Mild Surgical Apgar score, the mean Duration of hospital stay in Days (mean± s.d.) of patients was 8.7857± 2.9859. In Moderate Surgical Apgar score, the mean Duration of hospital stay in Days (mean± s.d.) of patients was 9.0968± 2.9705. In severe Surgical Apgar score, the mean Duration of hospital stay in Days (mean± s.d.) of patients was 9.2727 ± 2.1950. In Very Severe Surgical Apgar score, the mean Duration of

hospital stay in Days (mean± s.d.) of patients was 7.6667± 1.5275. Distribution of mean Duration of hospital stay in Days with Surgical Apgar score Group was not statistically significant (p=0.8621).

Discussion

This is hospital based prospective observational study to assess the utility of surgical Apgar score in predicting morbidity and mortality in patients undergoing general surgery. Study was conducted on population of about 108, aged between 15-75 years, who are undergoing general surgical procedures under general anaesthesia, spinal anaesthesia or epidural anaesthesia. Study place is conducted in Bokaro general hospital, a 910-bed tertiary care hospital in Bokaro steel city under Bokaro steel plant. The study comprised 108 individuals who were randomly selected and undergoing general surgical operations at Bokaro General Hospital. Vascular surgical procedures were not included in the study because they were not available during the study period. Thirty-one (28.7%) patients had a moderate surgical Apgar score, twenty-eight (25.9%) patients had a severe surgical Apgar score, eleven (10.2%) patients had a very severe surgical Apgar score, and 35 (32.4%) patients had a normal surgical Apgar score. The patients had a mean Surgical Apgar score of 6.8889± 2.3175 (mean ± standard deviation). Three individuals (2.8%) died and 105 (97.2%) patients survived our trial. We found that the mean Duration of hospital stays (mean ± s.d.) of patients was8.8704± 2.5727 Days.

We found that in Normal Surgical Apgar score, 1 (2.9%) patient was ≤30 years old, 3 (8.6%) patients were 31-40 years old, 21 (60.0%) patients were 41-50 years old, and 10 (28.6%) patients were 51-60 years old. In Mild Surgical Apgar score, 7 (25.0%) patients were 31-40 years old, and 21 (75.0%) patients were 51-60 years old. In Moderate Surgical Apgar score, 17 (54.8%) patients were 51-60 years old, and 14 (45.2%) patients were 61-70 years old. In Severe Surgical Apgar score, all patients [11 (100.0%)] were 61-70 years old. In Very Severe Surgical Apgar score, all patients [3 (100.0%)] were 61-70 years old. It was statistically significant (p<0.0001). Our study showed that in Moderate Surgical Apgar score, 1 (3.2%) patient had COPD,9 (29.0%) patients had DM, 6 (19.4%) patients had HTN and 4 (12.9%) patients had Obesity. In Severe Surgical Apgar score, 1 (9.1%) patient had COPD,1 (9.1%) patient had CVD, 1 (9.1%) patient had DM, 2 (18.2%) patients had DM and HTN and 2 (18.2%) patients had HTN. In Very Severe Surgical Apgar score, 1 (33.3%) patient had COPD,1 (33.1%) patient had DM and 1 (33.1%) patient had DM and HTN. It was statistically significant (p<0.0001). Regenbogen SE et al [8] (2009) a study involving 1441 patients with scores between 9 and 10 revealed that 72 (5.0%) of them experienced serious problems within 30 days, including 2 fatalities (0.1%). Comparatively, out of 128 patients who received a score of 4 or below, 72 experienced significant complications (56.3%; relative risk, 11.3; 95% confidence range, 8.6-14.8; P <.001), 25 of which resulted in death (19.5%; relative risk, 140.7; 95% confidence interval, 33.7-587.4; P <.001). For serious complications and deaths, the 3-variable score yields C statistics of 0.73 and 0.81, respectively. A quick, easy, and objective way to gauge and share surgical patient outcomes is through the Surgical Apgar Score. Sehgal S et al [9] (2019) discovered that when comparing emergency surgeries to elective surgical procedures, there was a greater rate of morbidity. A straightforward and practical way to forecast the morbidity and 30-day mortality of patients having general surgical operations is the surgical Apgar score. When it comes to forecasting the result of emergency cases, it is more sensitive than in cases that are elective.

In our study, in Normal Surgical Apgar score, all patients [35 (100.0%)] were Survived. In Mild Surgical Apgar score, all patients [28 (100.0%)] were Survived. In Moderate Surgical Apgar score, all patients [31 (100.0%)] were Survived. In Severe Surgical Apgar score, all patients [11 (100.0%)] were Survived. In Very Severe Surgical Apgar score, all patients [3 (100.0%)] died. This was statistically significant (p<0.0001). We observed that more patients had Acute renal failure in Severe Surgical Apgar score compared to Very Severe Surgical Apgar score [1 (33.3%)] which was statistically significant (p<0.0001). In Severe Surgical Apgar score, 3 (27.3%) patients had Bleeding it was also statistically significant (p<0.0001). It was found that in Severe Surgical Apgar score, 6 (54.5%) patients were required Transfusion and in Very Severe Surgical Apgar score, all patients [3 (100.0%)] were required Transfusion which was statistically significant (p<0.0001). In Very Severe Surgical Apgar score, 2 (66.7%) patients had Cardiac arrest, and this was statistically significant (p<0.0001). One patient (33.3%) with a Very Severe Surgical Apgar score was in a coma; this finding was statistically significant (p<0.0001). Two patients (6.5%) with a Moderate Surgical Apgar score developed Deep Vein Thrombosis; however, this was not statistically significant (p=0.2810). One patient (or 9.1%) with a severe surgical Apgar score suffered a myocardial infarction; this was not statistically significant (p=0.0636). All patients [3 (100.0%)] with Very Severe Surgical Apgar score experienced unplanned intubation, and the difference was statistically significant (p<0.0001). We also found that in Very Severe Surgical Apgar score, all patients [3 (100.0%)] were in Ventilator which was statistically significant (p<0.0001). Our study showed that in Moderate Surgical Apgar score, 2

(6.5%) patients had Pneumonia and in Severe Surgical Apgar score, 1 (9.1%) patient had Pneumonia which was not statistically significant (p=0.2814).

It was found that in Moderate Surgical Apgar score, 1 (3.2%) patient had Stroke and in Severe Surgical Apgar score, 1 (9.1%) patient had Stroke which was not statistically significant (p=0.3152).

Present study showed that in Moderate Surgical Apgar score, 2 (6.5%) patients had wound disruption and in Severe Surgical Apgar score, 1 (9.1%) patient had Wound disruption. This was not statistically significant (p=0.2814).

Our study showed that in Moderate Surgical Apgar score, 3 (9.7%) patients had Deep or organ space surgical site infection and in Severe Surgical Apgar score,

A statistically significant (18.2%) deep or organ space surgical site infection was observed in 2 individuals (p=0.0484). All patients [3 (100.0%)] in the Very Severe Surgical Apgar score had septic shock, and the difference was statistically significant (p<0.0001). All patients [3 (100.0%) with Very Severe Surgical Apgar score exhibited Systemic Inflammatory Response Syndrome, which was statistically significant (p<0.0001).

We found that the mean Age (mean± s.d.) of patients was higher in Very Severe Surgical Apgar score [67.0000 ± 2.6458yrs] compared to Normal Surgical Apgar score [46.9143 ± 6.0894 years], Mild Surgical Apgar score [52.1071 ± 8.3059 years], Moderate Surgical Apgar score [60.1935 ± 1.4241 years] and severe Surgical Apgar score [65.5455 ± 2.0671 years] which was statistically significant (p<0.0001).

We examined that in Normal Surgical Apgar score, the mean Surgical Apgar score (mean± s.d.) of patients was 9.4000 ± 0.4971. In Mild Surgical Apgar score, the mean Surgical Apgar score (mean± s.d.) of patients was 7.4286 ± 0.5040. In Moderate Surgical apgar score, the mean Surgical Apgar score (mean± s.d.) of patients was 5.4194 ± 0.5016. In severe Surgical Apgar score, the mean Surgical Apgar score (mean± s.d.) of patients was 3.3636 ± 0.5045. In Very Severe Surgical Apgar score, the mean Surgical Apgar score (mean± s.d.) of patients was 0.6667 ± 0.5774. It was statistically significant (p<0.0001).

We found that In Normal Surgical Apgar score, the mean Duration of hospital stay in Days (mean± s.d.) of patients was 8.7143 ± 2.0375. In Mild Surgical Apgar score, the mean Duration of hospital stay in Days (mean± s.d.) of patients was 8.7857 ± 2.9859. In Moderate Surgical Apgar score, the mean Duration of hospital stay in Days (mean± s.d.) of patients was 9.0968 ± 2.9705. In severe Surgical Apgar score, the mean Duration of hospital stay in Days (mean ± s.d.) of patients was 9.2727 ± 2.1950. In Very Severe Surgical Apgar score, the mean Duration of hospital stay in Days (mean ± s.d.) of patients was 7.6667 ± 1.5275. This was not statistically significant (p=0.8621).

Conclusion

The Surgical Apgar Score (SAS) is a simple, effective tool for predicting postoperative morbidity and mortality. Our study confirms that lower SAS values are significantly associated with higher rates of adverse outcomes, including stroke, sepsis, and mortality. Incorporating SAS into routine surgical assessments can aid in early identification of high-risk patients, allowing for timely interventions and improved clinical decision-making. Its ease of use makes it particularly valuable in both high-resource and resource-limited settings, enhancing overall patient care and outcomes.

References

1. Ranson JH, Rifkind KM, Roses DF et al Prognostic signs and the role of operative management in acute pancreatitis. Surg Gynecol Obstet 1974; 139: 69–81.
2. Knaus WA, Wagner DP, Draper EA et al The APACHE III prognostic system. Chest 1991; 100: 1,619–1,636,
3. Le Gall JR, Lemeshow S, Saulnier F. A new Simplified Acute Physiology Score (SAPS II) based on a European/North American multicenter study. JAMA 1993; 270: 2,957–2,963.
4. Barnett S, Moonesinghe SR. Clinical risk scores to guide perioperative management. Postgrad Med J 2011; 87: 535–541
5. Gawande AA, Kwaan MR, Regenbogen SE et al An Apgar score for surgery. J Am CollSurg 2007; 204: 201–208.
6. Levi E, Nasis L, Chiu D et al Is an Apgar score for surgical patients useful? ANZ J Surg 2009; 79: A32
7. Urrutia J, Valdes M, Zamora T et al Can the Surgical Apgar Score predict morbidity and mortality in general orthopaedic surgery? Int Orthop 2012; 36: 2,571–2,576.
8. Regenbogen SE, Ehrenfeld JM, Lipsitz SR, Greenberg CC, Hutter MM, Gawande AA. Utility of the surgical apgar score: validation in 4119 patients. Archives of Surgery. 2009 Jan 19;144(1):30-6.
9. Sehgal S, Ravishankar N, Raghupathi DS, Kotekar N. Can the surgical Apgar score predict morbidity and mortality in general surgery? International Surgery Journal. 2019 Apr 29;6(5):1481-6.