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Original Research Paper

Anesthesiology

SURGICAL APGAR SCORE ASSESSMENT AS A MORTALITY PREDICTOR IN HAJI ADAM MALIK HOSPITAL

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ABSTRACT

Introduction : Gawande starting to develop scoring system for surgery that can be use to assess patient condition during intraoperative. SAS calculated based on intraoperative parameters lowest MAP, lowest HR, and estimated blood loss.

Method : This study is using retrospective cohort in Adam Malik Hospital, Medan. Patient who undergo an abdominal surgery elective with general anesthesia were included in this study.

Result : A total of 109 patients studied, age ranged from 18 to 65 years. SAS was significantly associated to predict 30 days mortality post operative (p<0,001). Complications noted in 6 patients with SAS score 0 to 4 and 2 patients with SAS score 5 to 7.

Conclusion : Surgical Apgar Score (SAS) is a simple tool that can be use for assessing 30 days predictive mortality post operative patient with general anesthesia.

KEYWORDS : Surgical Apgar Score, Estimated Blood Loss, Mean Arterial Pressure, Heart Rate

Introduction:

In 1953, Virginia Apgar introduced a 10-point scoring system for evaluation of the condition of newborns, which revolutionized obstetric care.1 Until that point, obstetricians had only their subjective impressions of the immediate outcomes of childbirth. (1) The surgical Apgar score (SAS) is a simple score that uses intraoperative information on hemodynamic and blood loss to predict post-operative morbidity and mortality score on a scale of 0-10 calculated from three parameters collected during the operative procedure.(2) The present study was conducted to assess patient in Adam Malik Hospital.

Objectives:

a. To know the relation of Surgical Apgar Score assessment and prognosis of the patient.

b. To know what complications may occur during assessment of Surgical Apgar Score in Adam Malik Hospital.

c. To know the length of wtay in patient undergoing abdominal elective surgery in this hospital.

Materials And Method:

This study is using retrospective cohort in Adam Malik Hospital, Medan. Patient who undergo an abdominal surgery elective with general anesthesia were included in this study from January until May 2019. The inclusion criteria for this study is patient age from 18 to 65 years, patient with ASA I to IV, patient with duration of operation less than four hours. The exclusion criteria for this study is patient whit the history of pulmonal, renal, and cardiac diseases, an immunocompromised patient, and patient with immunosupressant therapy. After the approval from ethical committee from Medical Faculty, University Of North Sumatera, subjects was taken with total sampling method from Adam Malik Hospital medical record. Then we calculated Surgical Apgar Score and length of stay of the patients. After that, The study was analyzed with SPSS ver. 15

Results:

A total of 109 patients studied, 89 were females and 20 were males. Most of the surgeries were gynaecologyc surgeries; laparotomy surgical staging, myomectomy, and total abdominal hysterectomy. Patients with thirty days post operative were 6 peoples with standard deviation (0,7) and the low SAS score 0 to 4. Meanwhile, patient with SAS score 5 to 7 who have a complication were 2 peoples with standard deviation (0,55). After analyzed with T Independen test, we found a significant relation between SAS and post operative complications (p<0,001).

Table 1. Comparison Between SAS And Post Operative Complication

SAS (n= 109)	Complication (SD)	p
0-4	6 (0,7)	0,001
5-7	2 (0,55)	
8-10	0	

Table 2. Comparison Between SAS And Mean Length Of Stay

SAS (n=109)	Length Of Stay(SD)	p
0-4	12,67 (3,83)	0,001
5-7	5,69 (3,12)	
8-10	5,4 (3,1)	
Total	23,76 (3,11)	

A total of complication occured were 8 peoples and the most complication occured was pneumonia with 6 peopples (30%). Patient who used veniltator > 48 hours were 3 peoples (15%). Patient with surgical site infection were 2 peoples (10%), followed with patient who underwent relaparotomy procedure and urinary tract infection was 1 people (5%). Patient that died in this study were 5 peoples (25%).

Table 3. Post Operative Complication

Post Operative Complication	Gender		Total (%) n = 8
	Female (%) n = 4	Male (%) n = 4	
Pneumonia	2 (50)	4 (100)	6 (75)

Surgical Site Infection	1 (25)	1 (25)	2 (25)
Transfusi Darah > 4 Bag	2 (50)	0	2 (25)
Infeksi Saluran Kemih	0	1 (25)	1 (12,5)
Relaparotomi	1 (25)	0	1 (12,5)
Ventilator > 48 jam	1 (25)	2 (50)	3 (37,5)
Meninggal	3 (75)	2 (50)	5 (62,5)

Discussion:

From this study, a total patients that not get a complication were 101 peoples with SAS score 5 to 7 and 8 to 10.We can see that with high SAS score, hemodynamic during surgery can be maintained in the normal range. Mean Arterial Pressure (MAP) ≥ 65 mmHg, heart rate about 55- 65 times/ minutes, and estimated blood loss ≤ 100 cc, and so the perfusion to the vital organ like cardiac, pulmonal, and brain can still maintained. Cerebral Blood Flow (CBF) remains nearly constant between MAPs of about 60 and 160 mmHg. Beyond these limits, blood flow becomes pressure dependent. Pressure above 150-160 mmHg can disrupt blood brain barrier and may result in cerebral edema and hemorrhage.(3) Beside hemoglobin, the most important determinant of blood viscosity is hematocrit. A decrease in hematocrit decreases viscosity and can improve CBF, unfortunately, a reduction in hematocrit also decreases the oxygen-carrying capacity and thus can potentially impair oxygen delivery. Elevated hematocrit can increases blood viscosity and can reduce CBF. Some studies suggest that optimal cerebral oxygen delivery may occur at hematocrits of approximately 30%.(4) Another factor that correlates with heart rate is autonomic nervous system. Heart rate that increases because sympathetic response leads to vasoconstriction of brain vascular that can influence CBF and cause the endotel vascular leak and promote stroke and cerebral vasospasm complication.(5)

We conclude that patient with teh low SAS score leads to complication. Patient with low MAP (< 50 mmHg) can leads to systemic vasodilation involving both arteries and veins, which reduces ventricular preload (from venodilation) and ventricular afterload (from arterial vasodilation). The vascular changes are attributed to the enhanced production of nitric oxide (a vasodilator) in vascular endo-thelial cells. Injury in the vascular endothelium (from neutrophil attachment and degranulation) leads to fluid extravasation and hypovolemia, which adds to the reduced cardiac filling from venodilation. Proinflammatory cytokines promote cardiac dysfunction (both systolic and diastolic dysfunction), however the cardiac output is usually increased as a result of tachycardia and decreased afterload. Despite the increased cardiac output, splanchnic blood flow is typically reduced in septic shock. This can lead to disruption of the intestinal mucosa and "translocation" of enteric pathogens and endotoxins across the mucosa and into the systemic circulation. This, then, can be a source of progressive and unregulated systemic inflammation (which is the source of organ dysfunction in sepsis and septic shock). In the advanced stages of septic shock, cardiac output begins to decline, eventually resulting in a hemodynamic pattern that resembles cardiogenic shock (i.e., high cardiac filling pressures, low cardiac output, and increased systemic vascular resistance).(6)

Another hypothetical weakness lies in the fact that intraoperative hemodynamics maybe affected by anesthetic medications and interventions such as induction and intubation, and therefore, alter the computation of the SAS. For example, a transient episode of hypotension associated with anesthetic induction would be treated the same as prolonged hypotension and resulting a lower (worse) SAS. On the other hand, a transient bradycardic episode would contribute to a higher (better) score. Nevertheless, several studies demonstrate that persistent HR elevation and hypotension are strongly associated with poorer outcomes, regardless of their cause.(7)

Conclusion:

Surgical Apgar Score (SAS) is a simple tool that can be use for assessing 30 days predictive mortality post operative patient with general anesthesia. The use of Surgical Apgar Score can be recommend as a predictor mortality for elective surgery.

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