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ASSESSING E-PASS [THE ESTIMATION OF PHYSIOLOGIC ABILITY AND SURGICAL STRESS] SCORING SYSTEM AS A PREDICTOR OF POST OPERATIVE MORBIDITY

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Abstract:

Surgery alters the homeostatic balance and defence mechanisms in body eliciting certain responses called as stress response. In addition certain peri operative factors like post operative pain and psychological factors may also influence the degree of stress response reflecting surgical recovery. The present study is an attempt to estimate the effectiveness of E-PASS scoring system to assess the post operative risk by quantifying patients reserve and degree of surgical stress. . Surgical stress scoring system [E-PASS] is comprised of a pre operative risk score, a surgical stress score and comprehensive risk score. There have been a few reports of use of the E-PASS scoring system to assess the risk of mortality following special types of surgical procedures and it has been proposed as a means of predicting postoperative complications In the present study the incidence of post operative complications increased significantly with rising preoperative risk score and comprehensive risk score and was also significantly related with the length of stay. We found E-PASS scoring system beneficial for predicting the post operative complications and considering the perioperative factors. Thus we suggest that E-PASS scoring system may be useful in surgical decision making, predicting post operative risk and evaluating quality of care.

Key Words: *Stress response, E-PASS, Homeostasis, postoperative risk*

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INTRODUCTION:

Surgical stress greatly exceeding a patient's reserve capacity often disrupts the homeostasis of the respiratory, circulatory, metabolic, or immune systems, causing numerous postoperative complications. These postoperative complications may result from three major factors, namely, the quality of surgical performance, the patient's physiological status, and the degree of surgical stress applied. Where the quality of a surgical team has remained stable for a certain period, the morbidity and mortality rates after an operation could be estimated by quantification of the patient`s physiological status and the surgical stress. The Estimation of Physiologic Ability and Surgical Stress [E-PASS] was reported by Haga *et al*. [1]. This system comprises a preoperative risk score [PRS], a surgical stress score [SSS], and a comprehensive risk score [CRS] that is calculated from both the PRS and SSS. The Estimation of Physiologic Ability and Surgical Stress [E- PASS] scoring system is used to evaluate surgical risk after surgery [1] and it predicts postoperative fatal complications [2-5]. More- over, the E-PASS scoring system is useful for predicting and recognizing the risk of postoperative complications and for obtaining a better therapeutic outcome [6]. The Estimation of Physiologic Ability and Surgical Stress [E- PASS] scoring system evaluate surgical risk after surgery, and it predicts postoperative fatal complications [6]. More- over, the E-PASS scoring system is useful for predicting and recognizing the risk of postoperative complications and for obtaining a better therapeutic outcome [7]

Overwhelming surgical stress that exceeds a patient's physiological ability may result in the disruption of homeostasis organs, leading to postoperative complications in many organs. Based on this a predictive model was constructed which was designated as Estimation of Physiologic Ability and Surgical Stress [E-PASS]. Several cohort studies demonstrated reproducible outcomes for predicting postoperative morbidity and mortality [8-12].

MATERIALS AND METHOD:

100 patients undergoing surgeries at General Surgery department [male & female], Rajiv Gandhi Institute of Medical Sciences, Kadapa were included in this prospective study done over a period of 6 months after obtaining approval by the Hospital Research Ethics Committee. The required information was collected by both "patient interview and chart review method" which are well suited to access the results. During the study the patient's case records were received and the required data like demography, admitting diagnosis, past medical history, type of surgery etc. were collected in a well-structured data collection form.

Sequential process that has been used for assessing the efficiency of E-PASS as a necessary tool of prediction as follows,

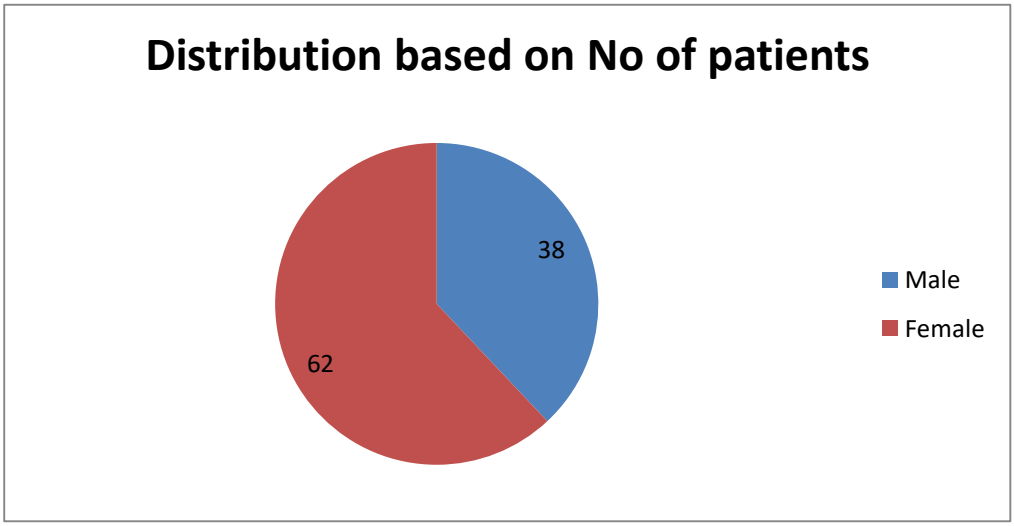
- Initially, the details of the patient were collected after obtaining the informed consent from the patient. Patient's consent was taken after explaining our study clearly to those patients who are willing to participate in our study.
- Data including demographic details, associated risk factors [Cardiovascular, Pulmonary, DM etc.,] and all other necessary details were recorded on a data sheet.
- After collecting the data E- PASS scoring system was used to estimate pre-operative risk score.
- Vitals were recorded in the data sheet after the surgery
- Necessary details like blood loss, type, duration of surgery etc., were recorded.
- EPASS was again used to asses surgical stress score.
- Pre-operative risk score obtained initially was added to the surgical stress score to obtain comprehensive risk score [CRS].
- CRS thus obtained was used to assess the incidence of morbidity, mortality and its relation to post operative risk.

RESULTS AND DISCUSSION:

Categorization Based on Gender:

In our study 50 subjects were screened out of which 38 [38%] were males and 62[62%] were females.

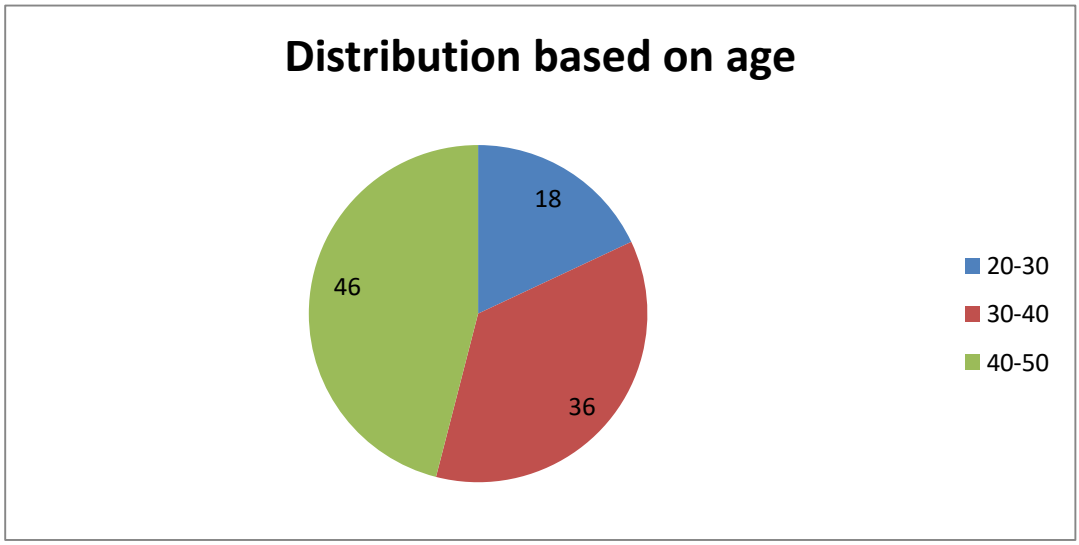
Gender	No. of patients	Percentage
Male	38	38
Female	62	62
Total	100	100



Categorization Based on Age:

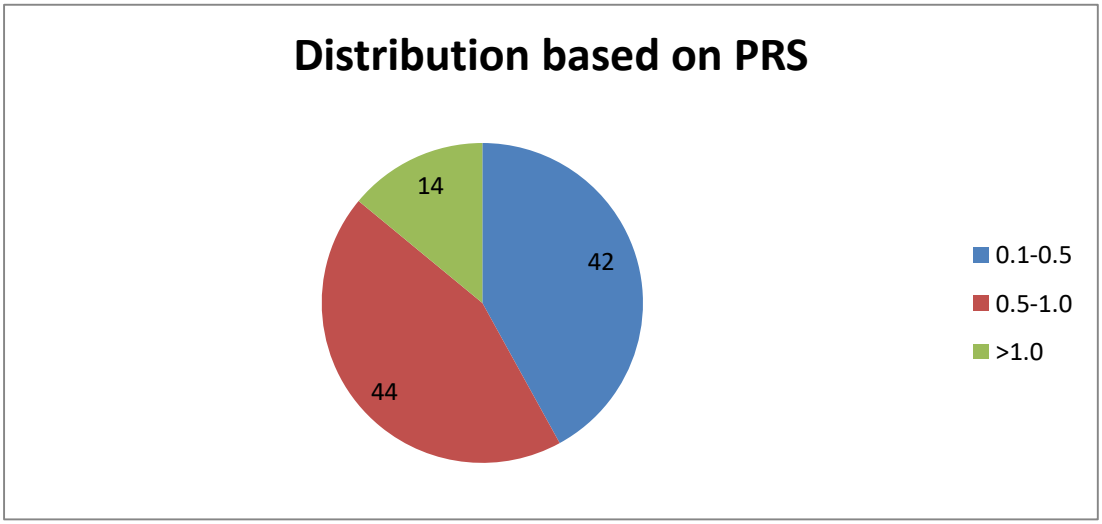
Among 100 patients, 18 [18%] patients were in between the age group of 20-30, 36[36%] were in 30-40 and 46 [46%] were in 40-50 years.

Age group	No of patients	Percentage
20-30	18	18
30-40	36	36
40-50	46	46



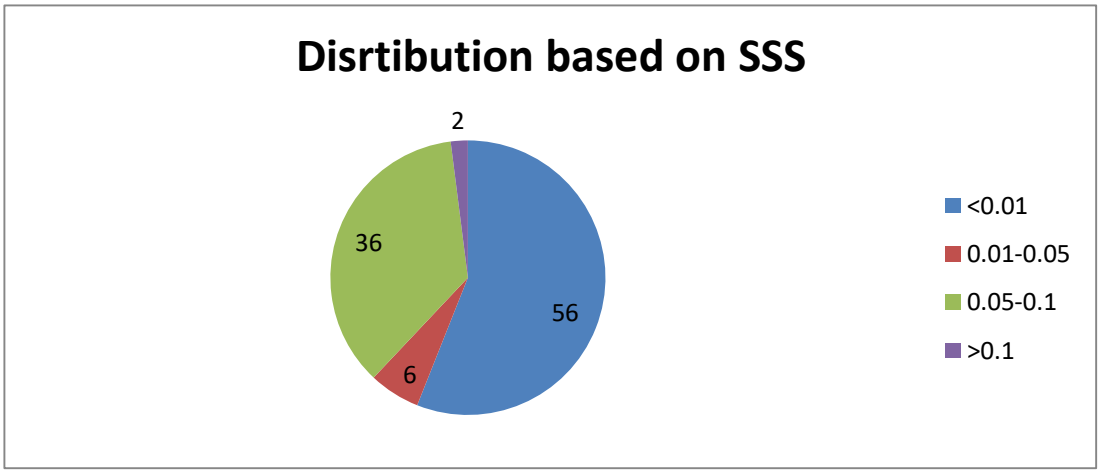
Categorization Based on Pre-Operative Risk Score:
Out of 100 patients; 42[42%] were with pre-operative risk score [PRS] in between 0.1-0.5, 44[44%] were in between 0.5-1.0 and 14[14%] patients have the pre-operative risk score >1.0 respectively.

Pre operatives risk score	No. of patients	Percentage
0.1-0.5	42	42
0.5-1.0	44	44
>1.0	14	14



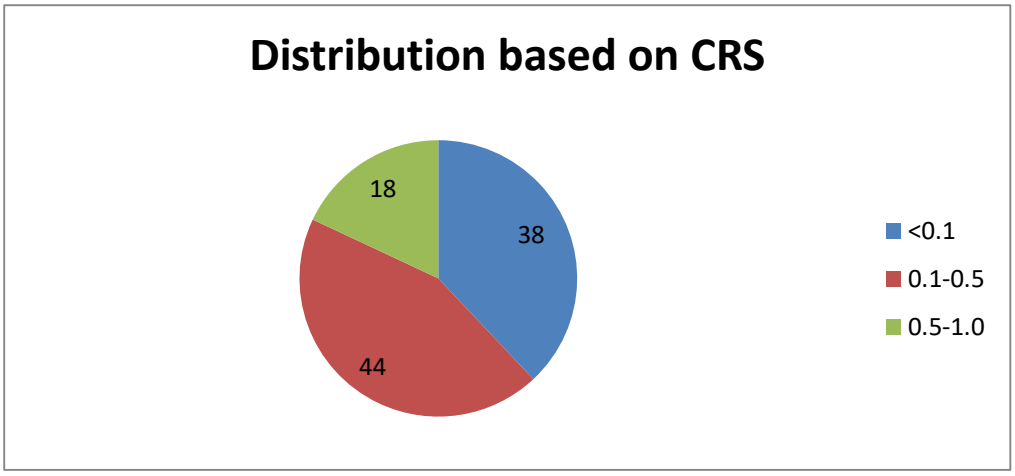
Categorization Based on Surgical Stress Score:
Out of 100, 56[56%] have surgical stress score <0.01%, 6[06%] have surgical stress score in between 0.01-0.05, 36[36%] have surgical stress score 0.05-0.1 and 2 patients has surgical stress score >0.1.

Surgical stress score	No. of patients	Percentage
<0.01	56	56
0.01-0.05	6	06
0.05-0.1	36	36
>0.1	2	02



Categorization Based on Comprehensive Risk Score:
Out of 100 patients; 38[38%] patients had the comprehensive risk score <0.1, 44[44%] were within 0.1-0.5 and 18[18%] had the comprehensive risk score in between 0.5-1.0.

Comprehensive risk score	No. of patients	Percentage
<0.1	38	38
0.1-0.5	44	44
0.5-1.0	18	18



Out of 100 patients, 42 were with pre-operative risk score in between 0.1-0.5, 44 with 0.5-1.0 and 14 with >1.0 among these 6,16 and 10 experienced post operative complications respectively.
Among the 100 patients, 62 were with surgical stress score <0.05% and 38 were with 0.05-0.1 among these 14 and 18 patients developed post operative complications respectively.
Among 100, 38 had the comprehensive risk score <0.1, 44 were with 0.1- 0.5 and 18with CRS 0.5-1.0 among these 10, 12 and 10 patients developed post-operative complications respectively.

Table 1: No.of Patients who experienced post operative complications

Parameter	**No.of Patients [100]**	**No.of Patients who experienced post operative complications**
Pre-operative risk score 0.1-0.5 0.5-1.0 >1.0	 42 44 14	 6 16 10
Surgical stress score <0.05 0.05- >0.1	 62 38	 14 18
Comprehensive risk score <0.1 0.1-0.5 0.5-1.0 >1.0	 38 44 18 0	 10 12 10 0

***Formulas for calculating the Estimation of Physiologic Ability and Surgical Stress [E-PASS] scores:** preoperative risk score [PRS], surgical stress score [SSS], and comprehensive risk score [CRS]: 1] PRS = −0.0686 + 0.00345X1 + 0.323X2 + 0.205X3 + 0.153X4 + 0.148X5 + 0.0666X6. X1, age [yr]; X2, presence [1] or absence [0] of severe heart disease; X3, presence [1] or absence [0] of severe pulmonary disease; X4, presence [1] or absence [0] of diabetes mellitus; X5, performance status index [0 - 4]; X6, American Society of Anesthesiologists physiological status classification [1 - 5]. Severe heart disease was defined as heart failure that was New York Heart Association Class III or IV, or severe arrhythmia requiring mechanical support. Severe pulmonary disease was defined as any condition with a %VC below 60% and/or an FEV 1.0% below 50%. Performance status index was based on the definition by the Japanese Society for Cancer Therapy. 2] SSS = −0.342 + 0.0139X1 + 0.0392X2 + 0.352X3. X1, blood loss/body weight [g/kg]; X2, operation time [h]; X3, extent of skin incision [0: minor incisions for laparoscopic or thoracoscopic surgery [including scope-assisted surgery]; a] laparotomy or thoracotomy alone; b] both laparotomy and thoracotomy]. 3] CRS = −0.328 + 0.936 [PRS] + 0.976 [SSS].

Out of 100 , the patients with comprehensive risk score <0.1, 0.1-0.5 and 0.5-1.0 had mean perioperative hospital stay of 9.3 days, 10.8 days and 18.2 days respectively shown in table 3.

Table 2: Comprehensive Risk Score and Peri-Operative Hospital Stay

Comprehensive risk score	No.of Patients	No. of Patients who experienced post OP complications	Peri-operative hospital stay [mean stay]
<0.1	38	10	9.3 days
0.1-0.5	44	12	10.8 days
0.5-1.0	18	10	18.2 days

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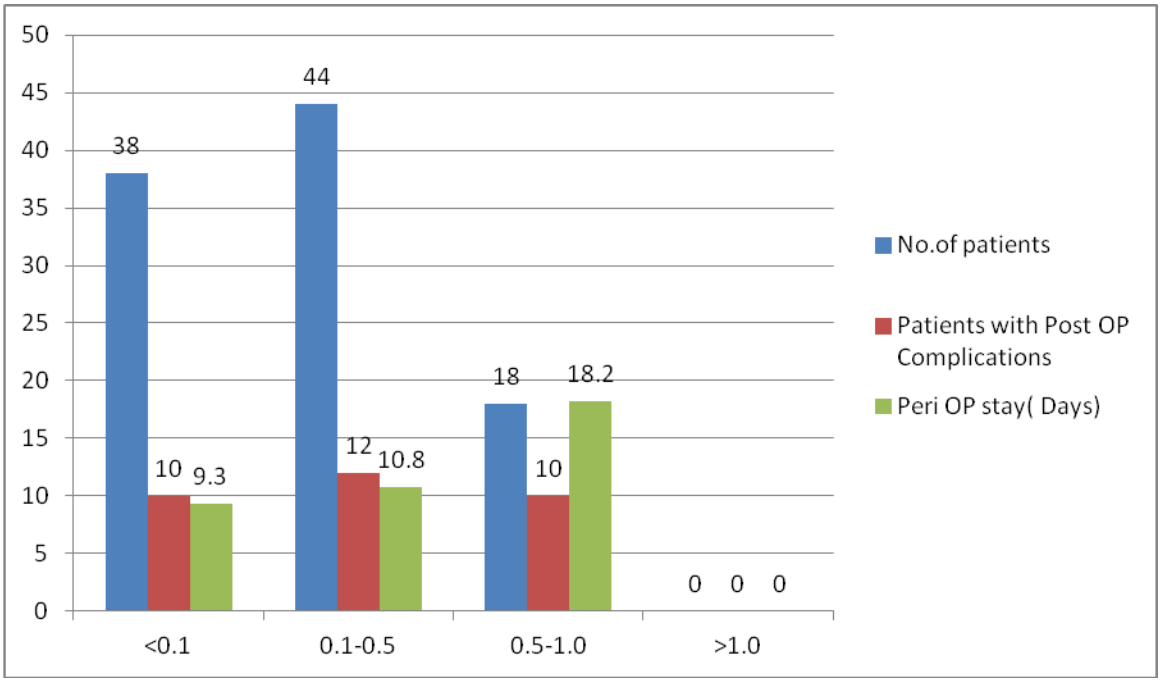

CONCLUSION:

In the present study, patients were exposed to an operative procedure which is a form of stress. In the light of present study, it could be concluded that E-PASS scoring system beneficial for predicting the post operative complications and considering the perioperative factors. E-PASS can be used as a mean of predicting postoperative complications. Thus we suggest that E-PASS scoring system may be useful in surgical decision making, predicting post operative risk and evaluating quality of care.

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