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INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/14506
DOI URL: http://dx.doi.org/10.21474/IJAR01/14506

ISSN NO. 2320-5407

RESEARCH ARTICLE

PROSPECTIVE EVALUATION OF PANC 3 SCORE IN PREDICTING SEVERITY OF ACUTE PANCREATITIS

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Manuscript Info

Manuscript History
Received: 25 January 2022
Final Accepted: 28 February 2022
Published: March 2022

Key words:-
PANC 3 Score, Acute Pancreatitis, Severity on admission

Abstract

Background: About 15-20% of cases of acute pancreatitis progress to a severe form, leading to high mortality rates. Thus early prediction of severity is utmost important so as to provide better management and decrease mortality.

Objective: To explore the efficiency of PANC 3 SCORE in predicting the severity in patients with acute pancreatitis on admission and its relation to clinical outcome .

Methods: Patients with Acute pancreatitis were assessed to sex, age, body mass index (BMI), etiology of pancreatitis, Hematocrit and presence or absence of pleural effusion at the time of admission intensive care need, length of hospital stay, length of stay in intensive care unit and mortality. The PANC 3 score was determined on admission and compared to acute pancreatitis grade of the Revised Atlanta classification.

Results: Out of 46 patients diagnosed with acute pancreatitis, 46 patients met the inclusion criteria. The PANC 3 score was positive in 4 cases (8.69%), pancreatitis progressed to a severe form in 7 cases (15.2%) and 3 patients (6.5%) died. Patients with a positive score and severe pancreatitis required intensive care more often, and stayed for a longer period in intensive care units. The PANC 3 score showed sensitivity of 42.85%, specificity of 97.45%, accuracy of 90.17%, positive predictive value of 75% and negative predictive value of 89.13% in prediction of severe acute pancreatitis.

Conclusion: The PANC 3 score has high specificity, high accuracy and high predictive value in prediction of severe acute pancreatitis. It has only 3 parameters which can be easily done in any healthcare system. It does not need much expertise to analyze PANC3 at the time of admission which adds the advantage of this score over other scoring systems.

Introduction:-

Pancreatitis is an inflammation of glandular parenchyma. It is due to activation of digestive enzymes present within the gland resulting in injury or destruction of the acinar cells within pancreas , adjacent tissues and other organs. The clinical course of acute pancreatitis fluctuates from a mild, self-limiting disease process that responds to supportive care to a severe necrotizing disease with multiple organ failure and high mortality. (1) (2)

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Lot of classification system has been introduced. The Ranson and modified Glasgow score contain data that are not routinely collected at time of admission, some parameters need to be collected at 48 hours of admission neglecting a potentially valuable early therapeutic window. (3) (4)

Thus early identification of severe acute pancreatitis has shown potential advantages of initiating aggressive treatment at intensive care unit or transfer to higher centre, by preventing or minimizing the possible complications.

The reason of this study is to see the efficacy and predictability of severity and mortality of precise scoring system for classifying patients according to the risk in the initial course of disease.

The advantage of the PANC 3 score is that it contains widely available tests that are quickly performed and easy to measure, can be done in out patient ward, doesn't need much expertise and to have high accuracy when predicting severe acute pancreatitis.

Aims And Objectives:-

1. To explore the efficiency of PANC3 score in predicting the severity in patients with acute pancreatitis on admission.
2. To correlate the outcome of the study with the scores observed in terms of disease severity and mortality.

Materials And Methods:-

The present study was conducted in department of General Surgery, jorhat Medical College and Hospital, JORHAT ASSAM after getting institutional eithcal clearance. It was a prospective analytical study with 46 in patient fulfilling inclusion criteria and conducted between june 2020 to May 2021.

Inclusion Criteria:

Includes patients with abdominal pain suggestive of AP, serum lipase or amylase level atleast three times greater than the upper limit of normal and or characteristic finding on imaging studies.

Exclusion Criteria

Includes Patients with organ failure at presentation or within 24 hr of admission , patient below 13 years of age, with co-morbid conditions such as cardiac failure, liver failure, and renal failure.

The PANC 3 score was determined by measuring three variables after diagnosis of acute pancreatitis:
1) serum hematocrit;
2) body mass index (BMI); and
3) pleural effusion on the chest x-ray

A case was considered positive if
serum hematocrit is >44 mg/dl,
BMI>30 kg/m2 and
pleural effusion detected on the chest x-ray.

Results:-

This study conducted in dept of general surgery, JMCH, Assam had 46 patients diagnosed with acute pancreatits.

Table no.1:- Patient particulars.

Characteristics	Value
Male	36 (78.26%)
Female	10 (21.73%)
Etiology Of AP	
Gallstone	30 (65.21%)
Alcoholic	16 (34.79%)
Severity of AP	
Mild	26 (56.52%)
Moderate	13 (28.2%)

Severe	7 (15.21%)

Table No2:- Association between the PANC 3 score and clinical outcome Showed 4 cases were PANC3 positive and 42 cases were PANC3 negative.

	Mild	Moderately Severe	Severe
PANC3 Positive	0	1	3
PANC3 Negative	26	12	4

Table No. 3:- Association between PANC3 score and clinical outcome Showed a positive association between PANC3 positive and negative cases.

PANC3	Length of stay (days)	p-value	Intensive Care facility required				Mortality % (n)	p-value
			% (n)	p-value	Days	p-value		
Positive	8.75 (3.09)	0.993	100% (4)	0.0112	5.0 (1.41)	0.042	25% (1)	0.243
Negative	8.76 (2.23)		28.57% (12)		6.77(1.36)		4.76% (2)	

Table No. 4:- Association between severity of acute pancreatitis and clinical outcome: Showed a positive association with length of stay in days with a p-value of 0.0167. It also showed a positive association with number of patients required ICU facility with a p-value of 0.0052.

Severity of AP	Length of stay (days)	p-value	ICU facility required				Mortality % (n)	p-value
			% (n)	p-value	Days	p-value		
Mild	12.04 (20.13)	0.0167	7.69% (2)	0.0052	7(2.83)	0.1926	0% (0)	0.2434
Moderately severe	10.08(1.93)		69.23% (9)		6.67(1.22)		7.69% (1)	
Severe	9.71(2.06)		71.42%(5)		7(1)		28.57% (2)	

Table no. 5:- Efficacy of PANC3 score in assessing severe acute pancreatitis Shows results as follows: Showed PANC3 score has hifg specificity, Accuracy and NPV.

Sensitivity	Specificity	Accuracy	PPV	NPV
42.85	97.45	90.17	75	89.13

Table No.6:- Efficacy of individual variable of PANC3 in predicting severe acute pancreatitis Showed that pleural effusion is the best individual predictor of severity in acute pancreatitis followed by BMI. The sensitivity and NPV of pleural effusion was higher than that of PANC 3 score.

	Sensitivity	Specificity	Accuracy	PPV	NPV
Hematocrit	28.75	92.30	82.60	40%	87.80%
BMI	71.42	82.05	80.43	41.66	94.14
Pleural Effusion	71.42	87.17	84.78	50%	94.44%

Table no. 7:- Average of PANC 3 variables . Showed severe cases are associated with higher hematocrit and BMI.

PANC3	Mild (mean)	Moderately Severe(mean	Severe (Mean)
Hematocrit	39%	38.71%	43.457%
BMI	26.91 kg/m^2	27.77 kg/m^2	29.37kg/m^2
Pleural Effusion	-	-	-

Table No. 8:- PANC3 score and severity in AP. Showed BMI and pleural effusion more associated with severity of pancreatitis.

PANC3	Mild	Moderately Severe	Severe
Hematocrit	1	2	2
BMI	5	2	5

Pleural Effusion	0	5	5

In this study 3 patients died out of 46 patients (6.5%) of which 2 cases were of severe AP.
In this study total 16 patients required ICU facility (34.78%) of which 4 cases were PANC3 positive.

Discussion:-

Prediction of severity is very crucial in AP as 15-20% cases presents with severe AP of which mortality rate is upto 50%. Thus early recognition of severe AP and adequate early measures can reduce the mortality rate to bellow 10%.

Males were predominantly involved in the study with 36 out of 46 patients (78.26%) female 10 patients which matches the results of similar study by Panda C et al. (77%) [5] , Shah et al. [6] Rathnakar SK et al. (81.7%) [7]

In this study, gallstone was the most common etiological factor present in 30 (65.79%) cases and alcohol was present in 16 (34.21%) cases which matches the finding of similar study conducted by Beduschi MG et al.(84.5%) [8] , Meena SK et al.(70%) [9] , Maher MM et al. (51.7%) [10] , Bohara TP et al. [11] (51.61%) .

Most common age group involved in my study was 31-40 year of age with 21 ou t of 46 patients which matches the results of similar studies by Sinha A et al. [6] Meena KS et al. [9], however a study by Beduschi MG et al. [8] stated that age group 30-60 most commonly involved.

This study shows sensitivity of 42.85, specificity 97.45, accuracy 90.17, PPV 75%, NPP 89.13% which matches the results of similar studies by Beduschi MG et al. [8] (sensitivity 50%. Specificity 100%, PPV 100%, NPV 90.6%, Accuracy 91.4%), Panda C et al. [5] (sensitivity 68%, specificity95.91%, PPV 89.47%, NPV 85.45%, accuracy 86.48%),Meena KS et al. [9] (sensitivity 81.82%, specificity 92.31%, NPV 94.7%, PPV 75%) , Rathnakar SK et al. [7] (sensitivity 82.6% specificity 77.9%, PPV 59%, NPV 92%), Taggarsi M et al. [12] (sensitivity 0%, specificity 100%, PPV 0%, NPV 79.62%, Accuracy 79.62%)

In this study mean hematocrit for mild pancreatitis was 39%, for moderate pancreatitis it was 38.71% and for severe pancreatitis mean hematocrit was 43.457%, which matches the results of similar studies by Panda C et al. [5](34.5%, 42.63%, 46.81%), Shah et al. [6] (35.5%, 45%, 45.91%) , Meena SK et al. [9](36.62%, 42.31%, 47.67%) , Rathnakar SK et al. [7] (43.46%, 46.57%)

In this study mean BMI for mild pancreatitis was 26.91kg/m^2 , moderate pancreatitis it was 27.77 kg/m^2 , and for severe pancreatitis it was 29.37kg/m^2 whereas a similar study by Panda C et al. [5] (25.076, 26.093, 30.86) , Meena KS et al. [9](23.65, 25.27) , Shah et al. [6] (25.036, 26.083, 30.997), Rathnakar SK et al. [7] (23.31, 25.48) also obtained similar results.

In this study pleural Effusion was present in 10 patients out of which 5 patients of severe AP had pleural effusion out of total 7 severe AP cases, (71.42%) where as a similar studies by Panda C et al. [5] found similar result where 21 patients of severe AP out of 29 cases had pleural effusion (84%) which matches the study by Heller SJ et al. [14] where 84.2% patients had pleural effusion on chest xrays.

Other studies by Meena KS et al. [9] (52%) Rathnakar Sk et al. [7] (78.3%)also found similar results.

In this study pleural effusion came out to be the best parameter to predict severity of acute pancreatitis with sensitivity of 71.42%, specificity 87.17%, PPV 84.78%, NPV 50% and Accuracy of 94.44%. which matches the results of similar study by Beduschi MG et al. [8] (sensitivity 60%, specificity 91.7%, PPV 60%, NPV 86.2%, accuracy 91.7%)

However study by Brown et al found that pleural effusion was second best variable after hematocrit to predict severity in acute pancreatits.

In this study when the number of patients required ICU care compared between PANC3 positive and PANC3 negative cases, the p value came out to be 0.0112which is statistically significant which matches the result of a similar study by Beduschi et al.[8]

Similarly p value for length of stay in ICU by PANC 3 positive and PANC 3 negative cases also came out to be significant with p value 0.042 that matches the results of a similar study by Beduschi et al. [8]

This study matches the previously described fact that patient with severe AP need considerable proportion ICU resources as described by Garcea G. et al.[15]

In this study 3 patients died out of 46 patients (6.5%) whereas a similar study by Beduschi MG et al. [8] (8.6%) stated that 5 patients died in his study.

Another study by Meena SK et al. [9] found that 5 out of 50 patients died (10%).
In this study, possibly because of limited number of patients with severe acute pancreatitis, no association was found between severe cases and higher mortality unlike what was mentioned in previous studies by Whitcomb DC et al. [16] Cruz-santamaria DM et al. [17] Anderson F. et al [18]. A similar study by Beduschi MG et al. [8] also could not found an association between severe cases and high mortality probably because of small number of patients with severe disease.

Limitations Of This Study:-

1. Small number of patients in this study.
2. Variation in timing of presentation of patients to the hospital after onset of symptoms may interfere with assessment of the scoring systems.

Conclusion:-

From this study, we can conclude that the PANC 3 score can be a simple, bedside and accurate clinical scoring system for the evaluation of disease severity in acute pancreatitis on admission. . Hence early identification and initiation of treatment can significantly alter the outcome of disease.

Funding :
No funding source.

Conflict of interest:
None declared.

Ethical approval:
This stuy was approved by Institutional Ethics Committee, JMCH.

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