Original Article

A Comparative Study Between BISAP Score And RANSON Score In Predicting Severity Of Acute Pancreatitis

[1]Dr Virendra S Athavale, [2]Dr Rohan Jaiswal*, [3]Dr Rodda Suma, [4]Dr Saili Kelshikar, [5]Dr Abhishek Shenoy

1. Professor, Department of General Surgery, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune, India 411018.
2. Resident, Department of General surgery, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune, India 411018.
3. Resident, Department of General surgery, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune, India 411018.
4. Resident, Department of General surgery, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune, India 411018.
5. Resident, Department of General surgery, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune, India 411018.

***Corresponding author:**
Dr Rohan Jaiswal, Resident, Department of General surgery, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune, India 411018.
Email: jaiswalrohan0811@gmail.com
DOI: 10.47750/pnr.2022.13.S09.1221

Abstract

Objective: Our aim was to prospectively evaluate the accuracy of the bedside index for severity in acute pancreatitis (BISAP) score in comparison to RANSON scoring system in predicting mortality, as well as intermediate markers of severity, in a tertiary care centre in Pune, India.

Methods: A total of 100 consecutive cases with acute pancreatitis were admitted to our institution between August 2020 – July 2023. BISAP and RANSON score were calculated for all cases, within 24 and 48 hours of presentation respectively. The respective abilities of the two scoring systems to predict mortality was evaluated using various statistical analysis. Revised Atlanta's classification was used to grade severity of acute pancreatitis and predictive capabilities were corroborated with both scoring system

Conclusions: We arrived to a conclusion that the BISAP scoring system could be a simple, cost effective and accurate clinical scoring system for the evaluation of prognosis in cases of acute pancreatitis and planning of management accordingly even though accuracy of both scoring systems is almost similar the cost and time efficiency of BISAP specially in a developing country like India makes it superior to BISAP in clinical setting.

Keywords: BISAP, RANSON, acute pancreatitis

INTRODUCTION

Acute pancreatitis is mainly defined as the acute inflammation of pancreatic parenchyma [1].

Acute pancreatitis is characterised by inflammation and necrosis of pancreatitis parenchyma, focal (pancreatic) enzymatic necrosis of pancreatic fat and vasculature (leading to haemorrhagic pancreatitis). As the pancreas lack capsule, inflammatory infiltrates are rich in neutrophils and can spread easily to fascial layer in its vicinity.[2]

Clinical definition of acute pancreatitis was defined as 2 or >2 of following criteria- Characteristic abdominal pain, and/or Increased serum amylase and/or lipase three time that of normal value, and/or Ultrasonography with in the first 7 days of hospitalisation demonstrating changes characteristic with acute pancreatitis.[3]

It is a common surgical challenge in general surgery practice worldwide as the spectrum of natural history varies from self-limiting to rapidly declining fatal condition. Types of acute pancreatitis based on increasing order of severity are; Acute oedematous; Acute persistent; Acute haemorrhagic necrotizing (severe acute pancreatitis).[4]

About 15-20% of acute pancreatitis patient experience severe acute pancreatitis [5], which as suggested by a study conducted by Muller ca and Glorar b in 2001 has a mortality rate of 9% as opposed to overall mortality rate of the disease which is 4%. Making accurate monitoring and grading of severity of severity of acute pancreatitis significantly important and useful in terms of clinical outcome.[5]

There are various methods of risk stratification for acute pancreatitis, all with their own merits and demerits, amongst which APACHE-II (Acute physiology and chronic health examination-II) is considered most accurate however is also of limited use owing to the requirement of collecting large numbers of parameters making it complex.[6] RANSON SCORING on the other hand is simpler and relatively accurate.

RANSON SCORE

AT ADMISSION:	**NON-GALL STONE PANCREATITIS**	**GALLSTONE PANCREATITIS**
Age	>55 yrs	>70 yrs
White Blood Cells	>16,000/mm^3	>18000/mm^3
Blood Glucose	>200mg/dl	>220 mg/dl
Serum Lactate Dehydrogenase	>350 IU/L	>400 IU/L
Serum Aspartate Transaminases	>250 IU/L	>250 IU/L
DURING INITIAL 48 HOURS		
Haematocrit decrease	>10%	>10%
Blood urea nitrogen increase	>5 mg/dl	>2 mg/dl
Serum Calcium	<8 mg/dl	<8 mg/dl
Arterial Po_2	<60 mm/Hg	NA
Serum base deficit	>4 mEq/L	>5 mEq/L
Fluid sequestration	>6 L	>4L

INFERENCE: Each criteria holds value of 1 point.

<3=0-3% mortality

3-5 =11-15% mortality

>6 = 40% mortality

But since it requires 48 hours' worth of data, it misses a potentially valuable early therapeutic window and even though accurate at extremes of scores is not very reliable at intermediate scores.[7]

Recently a newer system of scoring called BISAP (Bedside index for severity of acute pancreatitis) was developed, which helps in identifying patients at risk of increased mortality previous to onset of organ failure, this system of scoring is even simpler than RANSON scoring system and still maintains predictive accuracy as suggested by earlier studies.[6-8]

BISAP SCORE[6;7]

BUN	>25 mg/dl
Impaired mental status	GCS (Glasgow coma scale) <15
SIRS (Systemic inflammatory response syndrome) evidence	Fulfilling any two of the four following criteria:[16] 1. Fever >38^o C or hypothermia 2. Tachycardia >90 bpm 3. Tachypnea >20 4. TLC >12*10^9/L

	OR <4*10^9/L
Age	>60 years
Pleural effusion	With radiological evidence

INFERENCE: Each criteria holds value of 1 point

0-2 Points: Lower mortality (<2 percent)

3-5 Points: Higher mortality (>15 percent)

The purpose of this study was to establish the validity of the simpler severity scoring system of acute pancreatitis i.e.- BISAP and RANSON for ease of implementation and to establish which one of the two was more accurate and clinically useful in daily practice.

MATERIALS AND METHODS

Type of study: Prospective study

Place of study: Department of General Surgery, Dr D Y Patil, Medical College & Hospital, Pimpri, Pune-411018.

Period of study: August 2020 – July 2023

Source of data: OPD/IPD Patients of General surgery/Casualty/General Medicine, Dr. D. Y. Patil Medical College & Hospital, Pimpri, Pune

Sample size: 100 Consecutive cases of Acute pancreatitis fulfilling inclusion criteria.

(Taking a sensitivity of 71% at an acceptable difference of 25% had a confidence Level of 95% with organ failure proportion of 14%, The sample size works out to 93 rounded off to 100)

Procedure:

This prospective study was carried out for a period of 30 months in Dr D. Y. Patil Medical college & Hospital, Pimpri, Pune. Patients who presented as a case of acute abdomen were examined, and in suspected cases of pancreatitis, serum amylase, lipase along with ultrasonography of the abdomen was done. The diagnosis of Acute pancreatitis was made based on the Atlanta criteria, and a total of 100 patients will be included. Informed consent was obtained from all participants, Various clinical and biochemical parameters was studied on admission and 48 hours after admission to calculate BISAP and RANSON scores. Data was collected regarding demographics, detailed history, and physical examination, including complete hemogram, liver function test, and procalcitonin levels. Plain X Rays, CT /MRI / USG of the abdomen, was done to differentiate necrotizing from interstitial pancreatitis.

According to Atlanta criteria Acute pancreatitis was defined as presence of two of the following three features: -

1) Abdominal pain consistent with acute pancreatitis (acute onset of persistent, severe, epigastric pain often radiating to the back).
2) Serum amylase and/or lipase at least three times greater than the upper limit of normal value
3) Characteristic manifestations of acute pancreatitis on CECT, less commonly MRI / USG.

Infected necrosis of pancreas defined as lack of enhancement of parenchyma with abscess formation as assessed by CECT.

BISAP score within 24 hours and RANSON'S score will be obtained within 48hours of Hospitalization.

Organ failure was defined as a score of ≥ 2 in one or more of the three (respiratory, renal, and cardiovascular) as initially described in the Marshall score. Organ failure scores was calculated for all the patients during the first 72 hours of hospitalization based on the most extreme laboratory value or clinical assessment during each 24hours period. Duration of organ failure was graded as transient (≤ 48 hours) or persistent (>48 hours) from the time of presentation. All the patients were managed medically or surgically and monitored for development of any complications during the hospital stay. BISAP and RANSON'S scores thus obtained was analysed statistically.

METHODS: Institute's Ethics committee clearance obtained before the start of the study. Written and informed consent taken.

INCLUSION CRITERIA:

- Patients with history and clinical findings suggestive of acute pancreatitis.
- Age between 15-70 year.
- Both genders.
- All comorbidities included apart from exceptions.

EXCLUSION CRITERIA:

- Recurrent or chronic pancreatitis will be excluded from the study.
- Patient undergoing chemotherapy
- Immunocompromised state
- Pregnant females

STATISTICAL ANALYSIS:

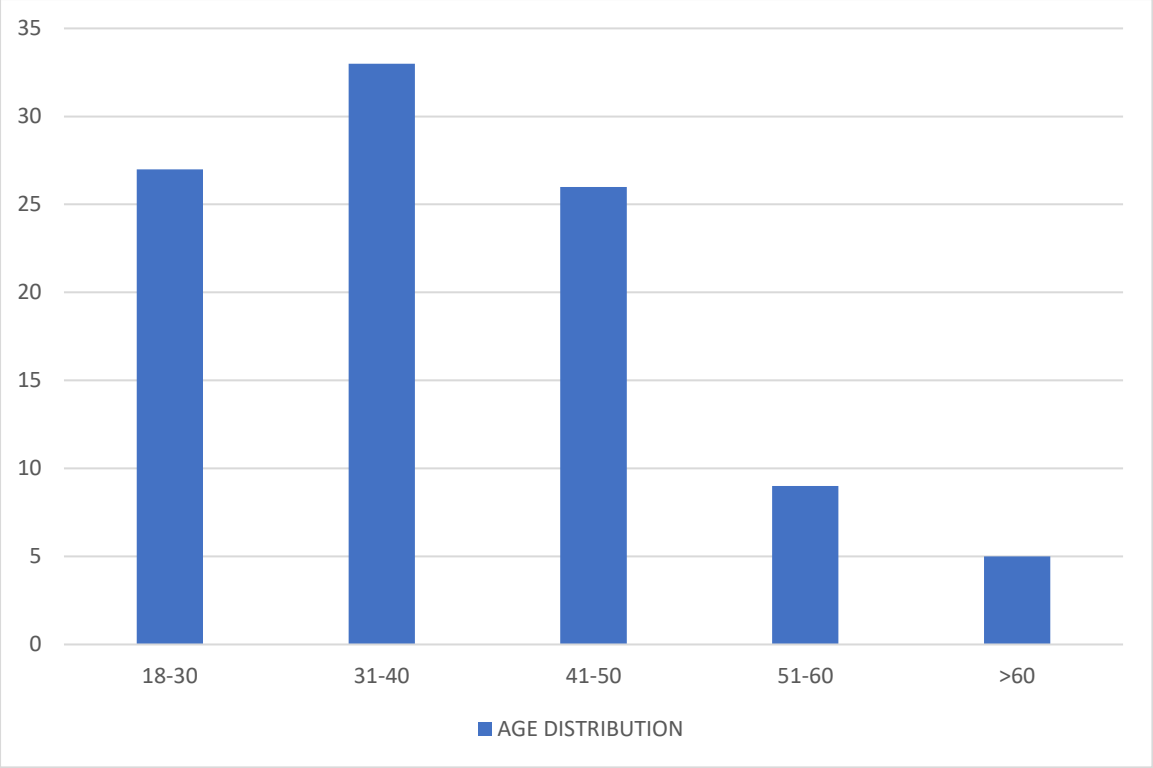
- Data from each patient was collected and tabulated using Microsoft Excel.
- Descriptive statistics presented in the form of percentage.
- Statistical analysis done using open EPI
- Statistical package- WinPEPI.
- Results assessed for significance (P value).

OBSERVATION AND RESULTS

This prospective study was conducted in the department of general surgery of Dr DY Patil medical college and hospital, Pimpri,Pune , for a period of three years. 100 patients diagnosed as a case of acute pancreatitis according to modified Atlanta's classification and who fulfilled the inclusion criteria were enrolled in this study after taking informed consent.

Age wise distribution

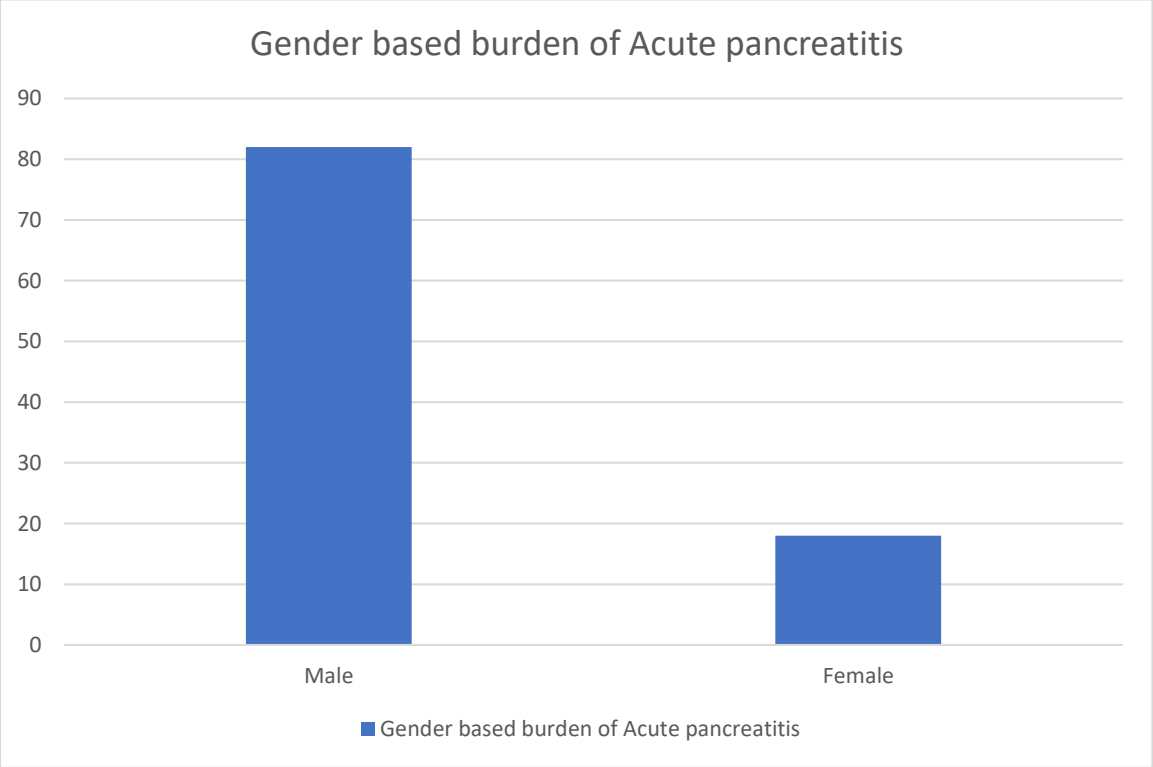
Age range (yrs.)	No. of patients	Percentage
18 – 30	27	27
31 – 40	33	33
41 – 50	26	26
51 – 60	9	9
>60	5	5



The age group of patients enrolled in the study ranges from 18 to 65 years with peak incidence of the disease noted in the 3rd decade of life.

Gender distribution

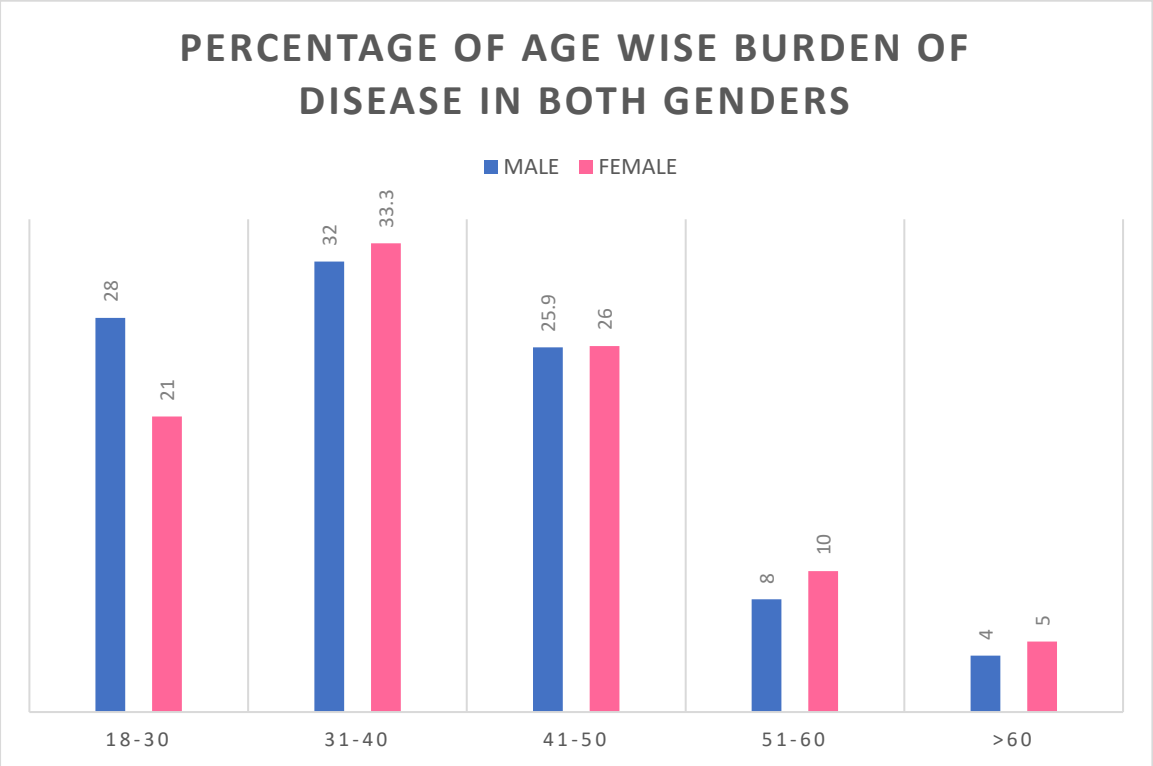
Sex	No. of patients	Percentage
Male	81	81
Female	19	19



Out of 100 patients enrolled in this study 81 were males and 19 female patients. Making Male: Female ratio of 8.2 :1.8

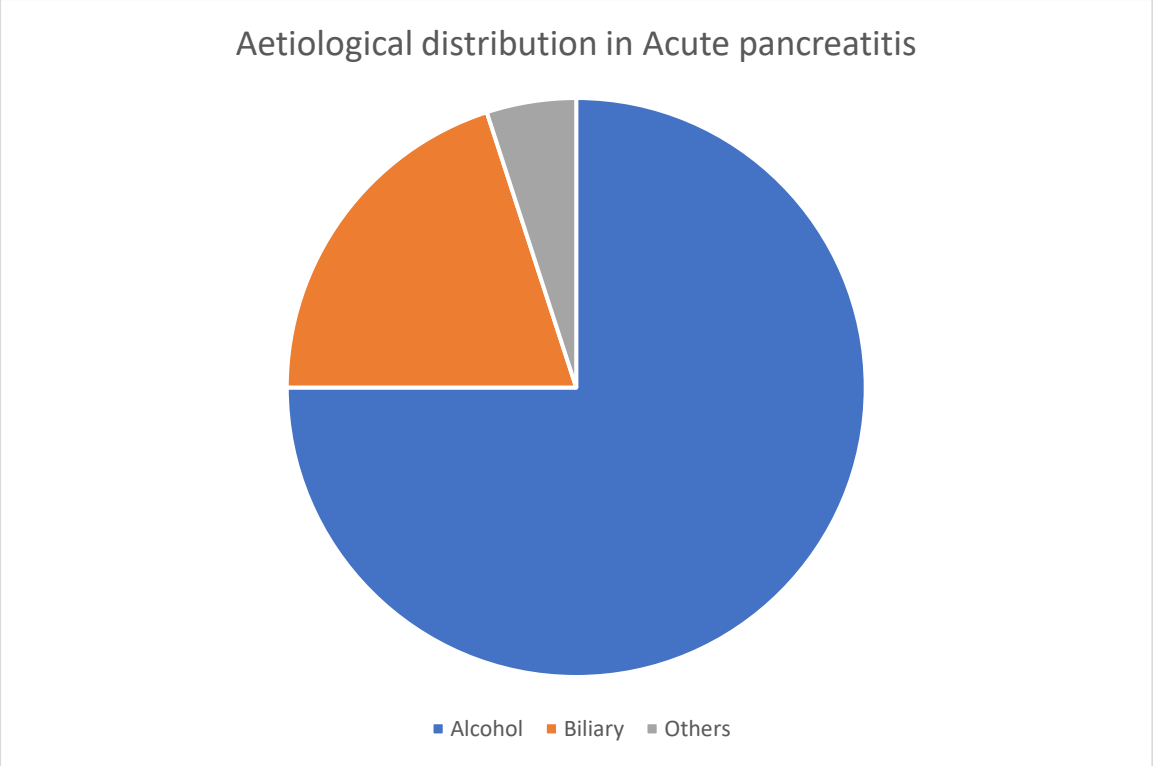
DISTRIBUTION IN ACCORDANCE WITH AGE AND GENDER

Age (yrs.)	Male		Female		Total	
	N	%	N	%	N	%
18 -30	23	**28**	4	**21**	27	27
31 – 40	26	**32**	7	**33.3**	33	33
41 – 50	21	**25.9**	5	**26**	26	26
51 – 60	7	**8**	2	**10**	9	9
>60	4	**4**	1	**5**	5	5
Total	81	100	19	100	100	100



AETIOLOGY

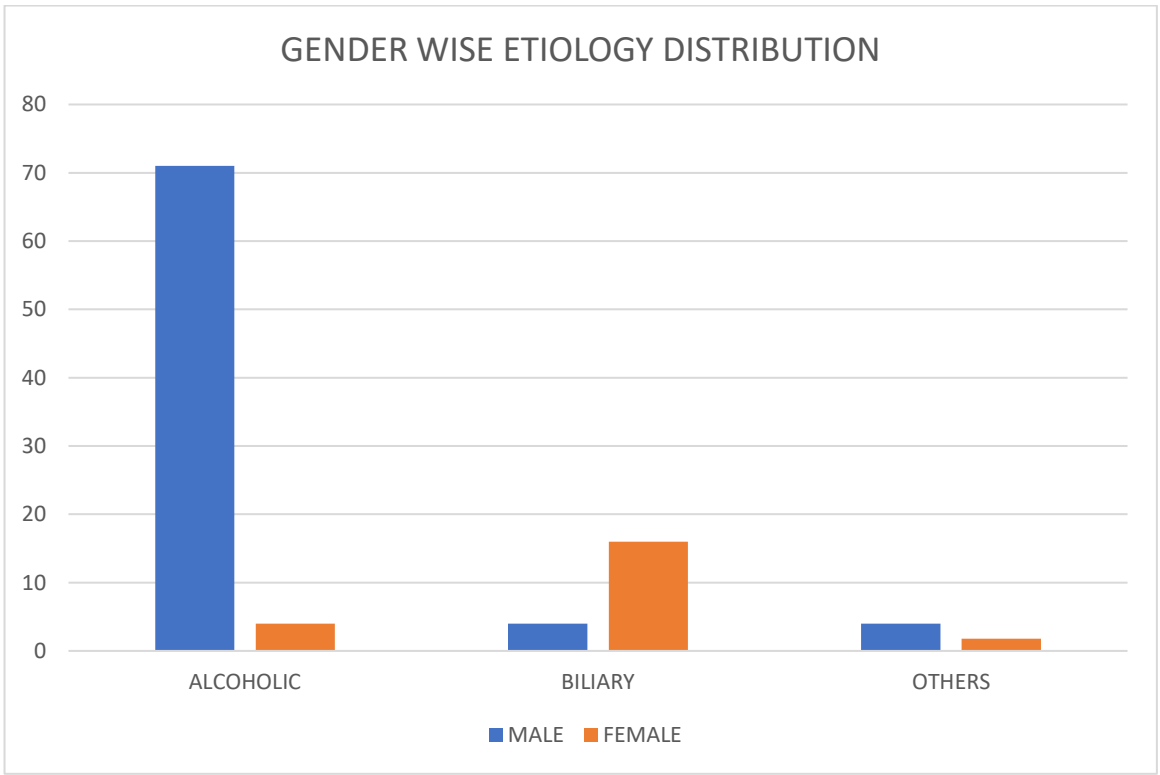
Etiology	Percentage of patients
Alcohol	75
Biliary duct obstruction	20
Others	5



Of the 100 patients evaluated 75% appeared to have alcohol as the causative factor while 20% had biliary ductal system obstruction induced pancreatitis as aetiology and remaining 5% had other aetiologies i.e.- iatrogenic, drug induced, Autoimmune, Idiopathic.

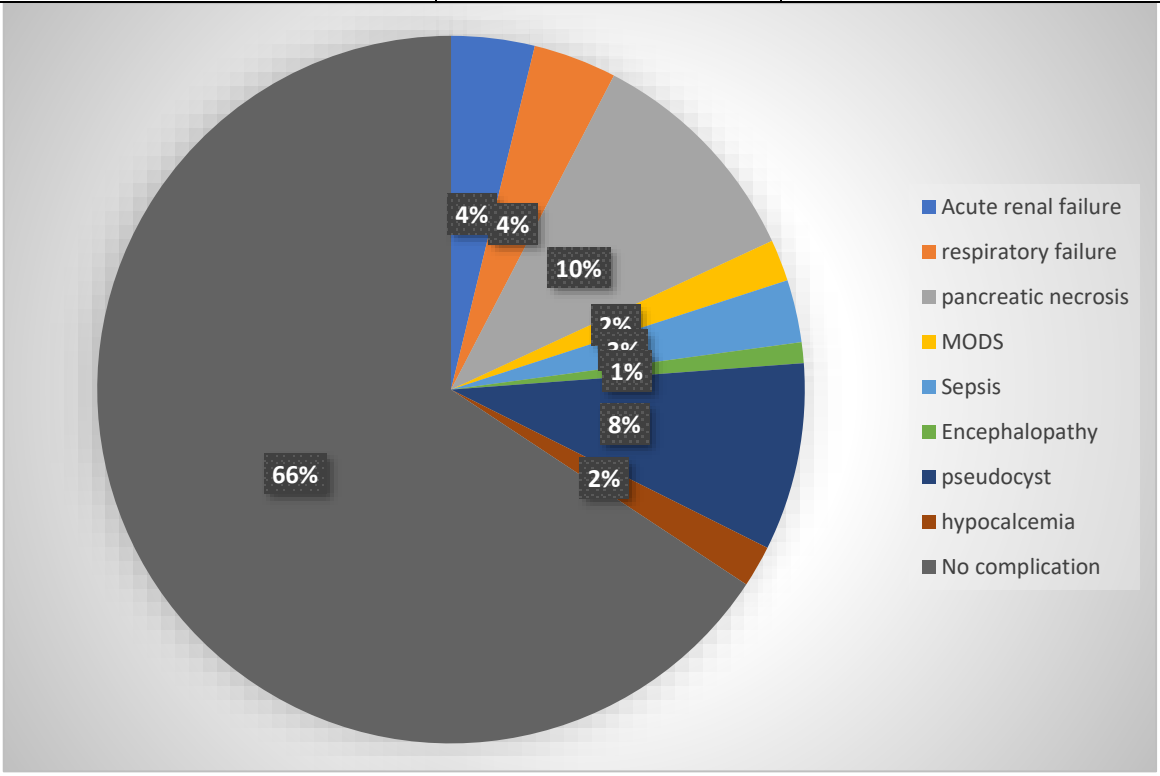
GENDER WISE CAUSATIVE DISTRIBUTION

GENDER	ALCOHOLIC	BILIARY	OTHERS
MALE	71	4	4
FEMALE	4	16	1



OBSERVED INCIDENCE OF COMPLICATIONS IN ACUTE PANCREATITIS.

Complication	No. of patients	Percentage
Acute Renal Failure	4	4%
Respiratory Failure	4	4%
Pancreatic necrosis	11	11%
Intra-abdominal abscess	0	0%
Multi organ dysfunction Syndrome	2	2%
Septicemia	3	3%
Encephalopathy	1	1%
Pseudo cyst	9	9%
Hypocalcemia	2	2%



Distribution of complication burden in studied demographic

CORRELATION OF BOTH SCORING SYSTEMS WITH SEVERITY OF ACUTE PANCREATITIS

In our study Mild Acute pancreatitis (MAP) –taken as episode of acute pancreatitis which develops no evidence of organ failure or localized complication as per Revised Atlanta classification. As per noted in previous studies it is expected to have BISAP score ranges from 0 to 2, While a score of less than 2 also is considered mild AP in RANSON scoring system in this group.

Severe acute pancreatitis (SAP) – taken as episode of acute pancreatitis which develops evidence of organ failure(transient/permanent) or localized complication as per Revised Atlanta classification Patients. In this category as per previous studies BISAP ≥ 3 and RANSON more than or equal to 3 is expected. In this category probability of MODS, organ failure and mortality is expected to be higher.

Out of 100 patients, 80 patients presented with mild acute pancreatitis and 20 patients developed severe acute pancreatitis. Out of 19 with severe attack, 2 patients expired.

Scoring system	No. of patients	Organ failure	ancreatic necrosis	Mortality
BISAP < 2	86	3	1	0
>3	14	10	10	2
Total	100	11	4	2

RANSON < 2	87	4	1	0
>3	13	8	7	2
Total	100	11	4	2

The patient outcome in form of Severe morbidity such as organ failure and pancreatic necrosis or mortalities were correlated with both scoring system

The severity of acute pancreatitis was correlated with the scoring systems with outcome in terms of organ failure, pancreatic necrosis and mortality, based on Modified Atlanta classification system of acute pancreatitis.

QUANTITATIVE ANALYSIS OF BOTH SCORING SYSTEMS

Prediction of severity by both scoring system

Scoring system	Total number of cases	Predicted mild AP (score < 3)	Actual cases of mild AP	Predicted Severe AP (score > 3)	Actual cases of severe AP
BISAP	100	86	80	14	20
RANSON	100	87	80	13	20

BISAP SCORE

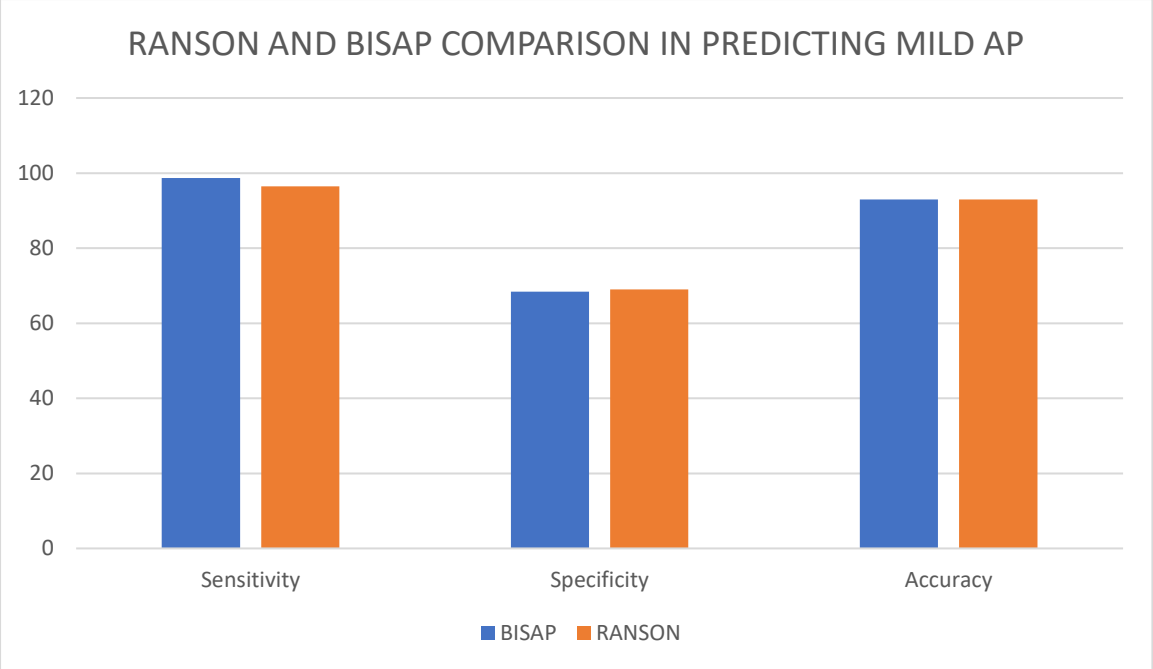
BISAP SCORE	**SEVERE AP**	**MILD AP**	**TOTAL**
BISAP < 2	6	80	86
BISAP > 3	14	0	14
TOTAL	**20**	**80**	**100**

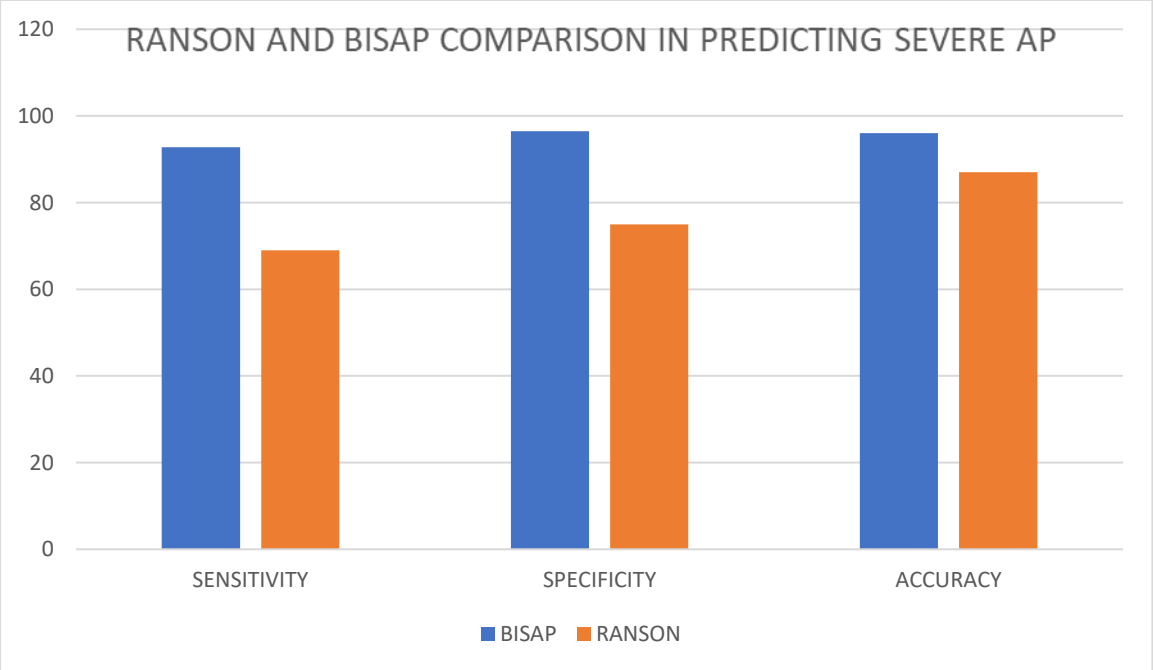
BISAP SCORE	**Sensitivity**	**Specificity**	**Positive predictive value**	**Negative predictive value**	**Accuracy**
< 2	98.7	68.4	93	92	93
> 3	92.8	96.5	81	98.8	96

Thus using Chi2 test, the occurrence of SAP when compared amongst BISAP scores correlates well with outcome with a p value <0.05.

RANSON SCORE

RANSON score	**Sensitivity**	**Specificity**	**Positive predictive value**	**Negative predictive value**	**Accuracy**
< 2	96.5	69	95.4	75	93
> 3	69	75	50	95	87





CORRELATION BETWEEN BOTH SCORING SYSTEM'S INABILITY IN PREDICTING ORGAN FAILURE, NECROSIS AND MORTALITY.

	BISAP < 2	**RANSON < 2**	**x2**	**P value**
ORGAN FAILURE	3	4	0.46	0.497
NECROSIS	1	4	3.022	0.082
MORTALITY	0	0	0.504	0.477

Out of 86 patients presented with BISAP score < 3, organ failure presented in 4 while pancreatic necrosis occurred in 1 patient, there were no mortality in this group.

Of 87 patients presented with RANSON score < 3, 4 developed organ failure while 4 developed pancreatic necrosis, there were no mortalities in this group either.

Thus, using Chi square test with Yates correction as expected values were below 5, there was no statistically significant difference between RANSON and BISAP scoring levels below 3 in inability to predict morbidity such

as organ failures (p value=0.497.), necrosis (p value=0.082) and mortality (p value=0.326), Both scoring systems correlates.

CORRELATING BETWEEN BOTH SCORING SYSTEMS ABILITY IN PREDICTING ORGAN FAILURE, NECROSIS AND MORTALITY.

	BISAP ≥ 3	RANSON > 3	X2	P value
Organ failure	10	8	0.0118	0.913
Necrosis	10	7	0.96	0.32
mortality	2	2	0.186	0.66

Thus, using Chi square test with Yates correction as expected values were below 5, there was no statistically significant difference between RANSON and BISAP scoring levels above or equal to 3 in their ability to predict morbidity such as organ failures (p value=0.913.), necrosis (p value=0.32) and mortality (p value=0.66), Both scoring systems correlates

DISCUSSION

Acute pancreatitis is a complicated condition with a wide range of severity and progression. Early diagnosis and severity classification are important for effective therapy. Although scoring systems might be helpful, clinical judgement should always take precedence. The regulation of fluid intake and nutrition are crucial components of acute pancreatitis therapy.[8]

In this study, The severity of acute pancreatitis in patients was evaluated using two different scoring systems BISAP and RANSON. A comparison with earlier, comparable research conducted on similar topic by others was also made.

According to our study, Most common age group affected is between 31-40 in both male and female, while Male demographic had 4 time higher incidence of acute pancreatitis than female with a ratio of 4:1. This outcome does not corroborate with the study conducted by Ashwin Raja A. in October 2019(M:F -19:1)[9] and J. Lalithkumar, T. Chitra, N (10:1) in September, 2016[14] where male preponderance exceeded exponentially than female in disease incidence.

Alcohol consumption was observed to be the commonest etiological factor in causing acute pancreatitis in our study, being associated with 75% of the cases while biliary causes were 20% and remaining 5% had other causes i.e.- drug induced, autoimmune, iatrogenic. This outcome is in corroboration with the study conducted by Jitin Yadav, Sanjay Kumar Yadav between November 2012 and October 2014 with Alcohol and biliary being 40.3% and 31% respectively[10]

This could also explain the male preponderance of the disease by the fact that alcohol consumption is more prevalent in the male gender cohort as observed in our study, this is in correspondence with previous studies done by Benegal V, Nayak M, on Alcohol, gender and drinking problems[2] and Khosla V, Thankappan KR, Mini GK[11,12] as well. Which also concluded that men were more likely to use alcohol (30–50%) than women (5–5%), who were less likely. However, a sizable study conducted recently among college students in the southern Indian state of Kerala revealed that the gap may be closing. This might also explain the lower Male-female ratio in our study considering change in trend of prevalence of commonest etiological etiological factor in our study i.e. Alcohol

In our study Alcohol was found to be the most common factor associated with AP in males, however Biliary pathology were more commonly associated in female demographic afflicted by AP

Most common complications observed in our study were pancreatic necrosis(11%), Pseudocyst of pancreas(9%) and respiratory failure(4%)

Patients under the age of 18 were not included in this study since their heart and respiratory rates are higher than those of adults. Therefore, even with mild illness, these patients might have predicted inaccurately that they were at risk for developing severe pancreatitis if they had been included in our trial.

Most patients do not display multiple organ failure while seeking medical assistance (often 12 to 24 hours after the onset of discomfort), but this is likely to happen by the second or third day. "Identifying patients at risk for mortality early in the course of acute pancreatitis is an essential step in improving outcome," wrote Dr. Wu Bu from Boston's Brigham and Women's Hospital and Harvard Medical School.[13]

We intended to assess the value of the BISAP scoring system—which has been shown to be an accurate prognostic indicator for Western setups—in an Indian population taking into account the socio-demographic variations and state of infrastructure of medical care in our nation. The relative simplicity with which data may be collected provided its accurate makes it more advantageous than the RANSON'S scoring system, which depends on information gathered at admission and within the first 48 hours, which has a higher cost burden and is more time consuming.

In our study, 80 patients were observed to have MAP and 20 patients found to have SAP, both scoring systems were applied to all the patients

In BISAP scoring system with score > 3 a sensitivity, specificity and accuracy of 92.8, 96.5, and 96 respectively was observed in predicting cases of Severe acute pancreatitis with a positive and negative predictive value of 81 and 98.8 respectively. While a BISAP score of < 2 has sensitivity, specificity and accuracy 98.7, 68.4 and 93 respectively with positive and negative predictive value of 93 and 92 in predicting cases of mild acute pancreatitis. The observed value implies that BISAP scoring system has excellent clinical significance and accuracy when score is > 3 while the scoring system cannot be relied on in clinical setting when value is < 3 due to the scoring system's poor ability to detect true negatives (of MAP) at this range. By using Chi^2 test, BISAP ≥ 3 has significant correlation with prediction of the occurrence of Severe acute pancreatitis ($p < 0.05$). These Finding corroborates well with Jitin Yadav, Sanjay Kumar Yadav study conducted in 2016 (sensitivity- 97.6 and specificity- 94.8)[10] and J. Lalithkumar, T. Chitra, conducted in September, 2016[14]

In RANSON scoring system with score > 3 a sensitivity, specificity and accuracy of 69%, 75%, and 87% respectively was observed in predicting cases of Severe acute pancreatitis with a positive and negative predictive value of 50 and 95 respectively. While a RANSON score of < 2 has sensitivity, specificity and accuracy 96.5, 69 and 93 respectively with positive and negative predictive value of 95.4 and 75 in predicting cases of mild acute pancreatitis. The observed value implies that while the scoring system cannot be relied on in clinical setting when value is < 3 due to the scoring system's poor ability to detect true negatives (of MAP) at this range which is similar to BISAP, the scoring system is highly effective at > 3 levels in predicting SAP and can be relied on confidently in clinical setting. By using Chi^2 test, RANSON ≥ 3 has significant correlation with prediction of the occurrence of Severe acute pancreatitis ($p < 0.05$). These Finding corroborates well with Jitin Yadav, Sanjay Kumar Yadav study conducted in 2016 (sensitivity- 97.6 and specificity- 93.5) and [10] and J. Lalithkumar, T. Chitra published in September, 2016[14]

On correlating both the scoring system with each other in their ability and inability to predict Severe acute pancreatitis, organ failure and pancreatic necrosis using Chi square test with Yates correction, there was no statistically significant difference between RANSON and BISAP scoring levels < 2 in their inability to predict morbidity such as organ failures (p value=0.497.), necrosis(p value=0.082) and mortality (p value=0.326) with similar correlation observed at score > 3 with their ability to predict morbidity such as organ failures (p value=0.913.), necrosis(p value=0.32) and mortality (p value=0.66), Both scoring systems correlates almost equally. With BISAP > 3 having slightly higher advantage in predicting pancreatic necrosis. These finding does not corroborate with Papachristou GI, Muddana V study published in October 2009[46], however they noted in their conclusion that RANSON scoring system does perform less efficaciously when severe acute pancreatitis is defined according to Modified Atlanta's criteria while in their study, they compared both scoring system with their ability to predict transient and permanent organ failure[5]. However, our comparison does corroborate with Lalithkumar, T. Chitra in September, 2016[14] and Jitin Yadav, Sanjay Kumar Yadav study of November 2012[10]

This study was conducted at a tertiary care hospital of Dr. DY Patil medical college and hospital, pimpri, pune. The overall mortality in our cohort was 2%. BISAP is a relatively newer modality of risk stratification in case of acute pancreatitis compared to RANSON, BISAP calculates a five-point score using the results of a physical examination, vital signs, regular laboratory data, and imaging findings which can be evaluated within 24 hours of patient presentation while The main goal of RANSON'S score, which consists of 11 measurements, is record binary values upon admission and after 48 hours of presentation, and to assess how early surgical intervention in patients with AP functions[15]. Our study observed BISAP slightly more efficacious than RANSON in predicting severe acute pancreatitis with accuracy of 96% of the former compared to 87% of the latter. However, it was also observed that BISAP relies on non-binary component of physical examination which is subjective to clinician's bias as oppose to RANSON which has only binary components which removes the component of observers bias when evaluating on a clinical setting.

CONCLUSION

From this study, we arrived to a conclusion that the BISAP scoring system could be a simple, cost effective and accurate clinical scoring system for the evaluation of prognosis in cases of acute pancreatitis and planning of management accordingly even though accuracy of both scoring systems is almost similar the cost and time efficiency of BISAP specially in a developing country like India makes it superior to BISAP in clinical setting. We also recommend trials to check efficacy of BISAP scoring 48 hourly serially to evaluate effect of treatment or any progressive or regressive prognosis change, due to its cost and time efficiency along with accuracy. Further large-scale studies are needed to evaluate these scoring systems at variable levels of centers.

LIMITATIONS OF THE STUDY

(1) Sample bias, this study was conducted in a tertiary care hospital where chances of presentation of complicated/severe cases are higher and more sophisticated standards of treatment might be available as compared to a primary health care center hence mortality and complications rate might not be an accurate representation for other levels of healthcare centers.

(2) BISAP scoring system involves parameters based on physical examination which might lead to observer's bias

(3) RANSON scoring system involves sum of parameters taken on admission and 48 hours after admission, during which medical or surgical intervention might change the latter values which will be different in different settings leading to confounding bias.

REFERENCES

1. Angelini G, Cavallini G, Pederzoli P, et al. Long-term outcome of acute pancreatitis: Prospective study with118 patients. Digestion, 1993; 54: 143- 147
2. Beger HG, Rau B, Mayer J, Pralle U. Natural course of acute pancreatitis. World J Surg., 1997; 21: 130- 135.
3. Parimala, Princess Beulah. Comparative study between BISAP score and RANSON score in predicting severity of acute pancreatitis. International Archives of Integrated Medicine; Vol. 6, Issue 6, June, 2019.
4. J. Lalithkumar, T. Chitra, N. Kodieswaran. Comparative study between BISAP and Ranson's score in predicting severity of acute pancreatitis. International Archives of Integrated Medicine; Vol. 3, Issue 9, September, 2016.
5. Amulya Aggarwal, Alok V. Mathur, Ram K. Verma, Megha Gupta, Dheeraj Raj. Comparison of BISAP and Ranson's score for predicting severe acute pancreatitis and establish the validity of BISAP score. International Surgery Journal; 2020 May;7(5):1473-1480.
6. Mortality in patients with severe acute pancreatitis. Br J Surg Society. 2001;88(7):975-9.
7. Ashwin Raja A. Comparative study between ranson's score and bisap score in predicting the severity of acute pancreatitis. International Journal of Current Advanced Research; Volume 8; Issue 10 (B); October 2019; page no. 20143-20147.
8. Mederos MA, Reber HA, Girgis MD. Acute Pancreatitis: A Review. JAMA. 2021;325(4):382–390. doi:10.1001/jama.2020.20317
9. Ashwin Raja A. Comparative study between ranson's score and bisap score in predicting the severity of acute pancreatitis. International Journal of Current Advanced Research; Volume 8; Issue 10 (B); October 2019; page no. 20143-20147
10. Jitin Yadav, Sanjay Kumar Yadav, Satish Kumar. Predicting morbidity and mortality in acute pancreatitis in an Indian population: a comparative study of the BISAP score, Ranson's score and CT severity index. Gastroenterol Rep. 2016;4(3):216–220.
11. Benegal V, Nayak M, Murthy P et al. Women and alcohol use in India. In: Obot IS, Room R, eds. Alcohol, gender and drinking problems: perspectives from low and middle income countries. Geneva: World Health Organization, 2005.
12. Khosla V, Thankappan KR, Mini GK et al. Prevalence & predictors of alcohol use among college students in Ludhiana, Punjab, India. Indian J Med Res 2008; 128(1): 79–81
13. Wu BU, Johannes RS, Sun X, Tabak Y, Conwell DL, Banks PA. The early prediction of mortality in acute pancreatitis: a large population-based study. Gut. 2008 Dec;57(12):1698-703. doi: 10.1136/gut.2008.152702. Epub 2008 Jun 2. PMID: 18519429.
14. J. Lalithkumar, T. Chitra, N. Kodieswaran. Comparative study between BISAP and Ranson's score in predicting severity of acute pancreatitis. International Archives of Integrated Medicine; Vol. 3, Issue 9, September, 2016
15. Ranson JH , Rifk ind KM , Roses DF et al. Objective early identifi cation of severe acute pancreatitis. Am J Gastroenterol 1974 ; 61 : 443 – 51.