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Procalcitonin Based Algorithm In Antibiotics Usage For Cases Of Acute Pancreatitis.

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ABSTRACT

Differentiating infection from inflammation in acute pancreatitis is difficult, leading to overuse of antibiotics. Procalcitonin (PCT) measurement is a means of distinguishing infection from inflammation as levels rise rapidly in response to a pro-inflammatory stimulus of bacterial origin and normally fall after successful treatment. Algorithms based on PCT measurement can differentiate bacterial sepsis from a systemic inflammatory response. The PROCalcitonin-based algorithm for antibiotic use in Acute Pancreatitis (PROCAP) trial tests the hypothesis that a PCT-based algorithm to guide initiation, continuation and discontinuation of antibiotics will lead to reduced antibiotic use in patients with acute pancreatitis and without an adverse effect on outcome.

Keywords: Acute Pancreatitis (PROCAP), Procalcitonin (PCT), Sepsis, Antibiotic Therapy

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INTRODUCTION

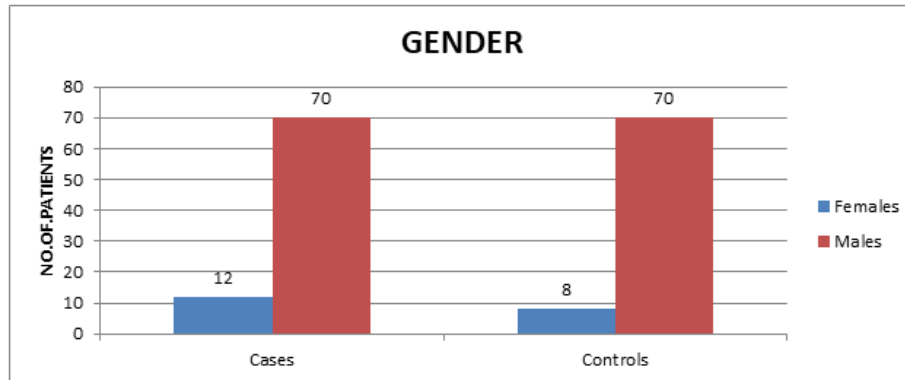
In order to reduce mortality and morbidity in such conditions, use of antibiotics plays a major role. Also, unnecessary use of antibiotics in a self-limiting pancreatitis may lead to development of multidrug resistance and also organ failure related to drug toxicity. Even though there are several clinical scores with a high sensitivity, specificity, positive, and/or negative predictive value, many of them are complicated to assess or can predict severity only after 48 h of admission to the hospital, which effectively means more than 72 h after the onset of disease. The first step in the diagnosis of AP should be a thorough clinical history. The pain caused by AP is typically dull, located in the epigastrium, may radiate into the back, and is usually severe, leading to hospital admission and often necessitating opioid therapy [5]. Based on a review published in 2011, this current narrative review aims to update clinicians on (promising) new indications for PCT in patient management by focusing on research studies published from 2012 to the end of 2016. In a small RCT of patients with acute pancreatitis, a PCT-guided antimicrobial approach was shown to be safe and effective compared to a control group that received prophylactic antibiotic treatment for 2 weeks. Emerging bacterial resistance to antimicrobial agents calls for more effective efforts to reduce the unnecessary and prolonged use of antibiotics in self-limiting non-bacterial and resolving diseases. Estimation of PCT may therefore be valuable in predicting the risk of developing IPN. Ji et al observed that the post-percutaneous catheter drainage (PCD) serum procalcitonin level might be a respondent factor that is correlated with the necessity of necrosectomy. Our study which is a randomised controlled study involves the use of procalcitonin levels to evaluate the dose of antibiotics in self-limiting pancreatitis. It was conducted on a group of 160 patients, in KAPVGMCA admitted in emergency ward between 2022- February to 2023 February. Our diagnosis was made according to the American College of Gastroenterology guidelines. At least 2 out of the following 3 criteria must be met for AP diagnosis: (1) presence of characteristic epigastric pain; (2) amylase and/or lipase values of > 3 times the upper limit of normal; and (3) presence of characteristic imaging findings of AP and they are evaluated with procalcitonin assay and included for our study if only with levels less than 0.1ng/dl. They were divided into two groups such as study group and control group. The former group was subjected to conservative management which entailed with iv fluids and analgesic therapy such as non-steroidal anti-inflammatory agents, narcotic analgesic with no antibiotic usage. The control group were provided with a broad-spectrum antibiotic, along with supportive therapy, and the prognostic outcome of the patients were studied over a period of 6 months [1-9].

MATERIALS AND METHODS

Our patients were evaluated over a period of 10 days. as in patients. During the period of their stay clinical symptoms, biochemical parameters such as serum amylase, serum lipase, CRP and total leucocyte counts and also radiological findings related to pancreatitis were evaluated and documented on day0, day 3 and day 7. Out of the 160 patients, on third day 50 % of the study group showed dramatic response irrespective of antibiotics usage, on day 7, 80% of study group showed favorable response. 20% of patients had an equivocal response and they are subjected to antibiotic therapy. These were followed up for 6 months. Such patients were seemed to get admitted during the period of 6 months. Such patients seemed to get admitted during the period of 6 months following alcohol binge as an acute exacerbation of pancreatitis. Eventually many of these patients ended up with chronic calcified pancreatitis or pseudocyst of pancreas or necrotising pancreatitis.30% of the patients irrespective of etiology had associated comorbid factors such as diabetes, hypertension, dyslipidimias, post covid status sequela and hence showed poorer prognosis despite antibiotic therapy.5% of patients in study group showed leucocytosis, increased CRP levels and features of sub-acute obstruction and pleural effusion. Then they were subjected to antibiotic therapy and ICU care. A randomised controlled study on procalcitonin based algorithm in antibiotic usage in acute pancreatitis.

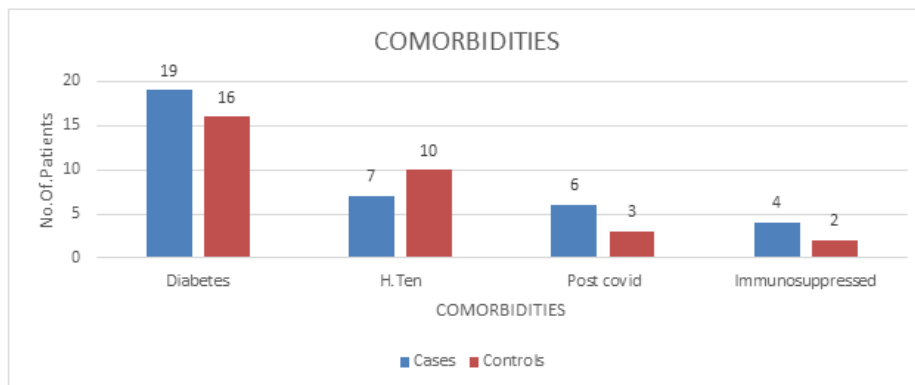
RESULTS

Figure 1: Distribution of Number of Males and Females among Cases and Controls



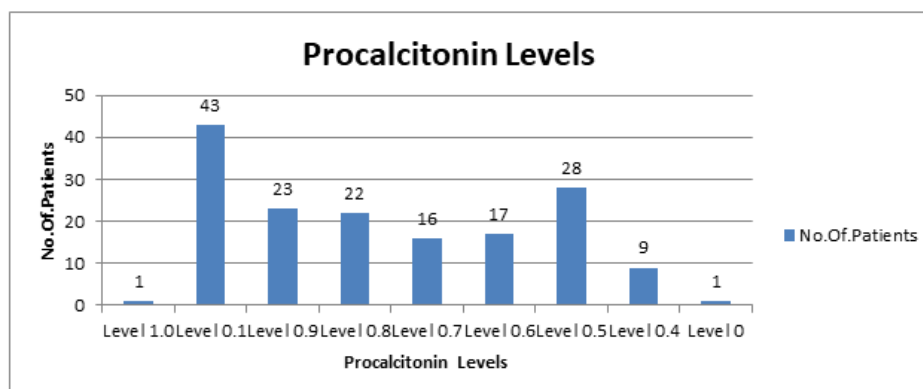
Above mentioned Simple Bar chart represents Number of Males and Females among Cases and Controls involved in the study. Out of 160 patients 82 are Cases and 78 are Controls. Among cases 70 are Males and 12 Females whereas in Controls 70 Males and 8 Females are included.

Figure 2: Distribution of various comorbidities among the Study participants



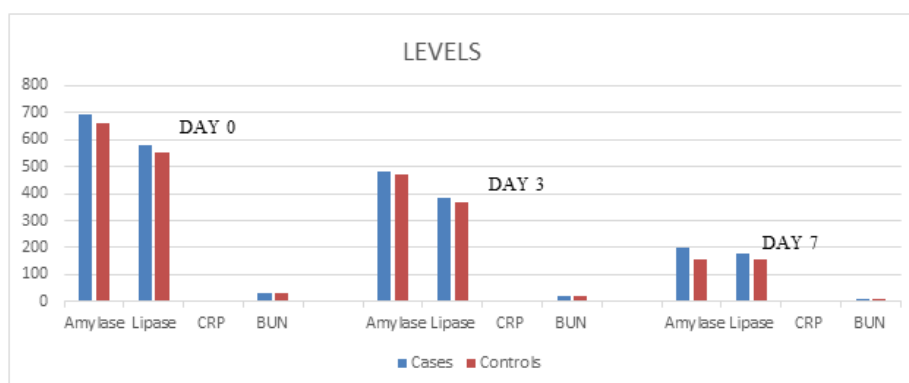
The multiple Bar chart represents the various types of Comorbidities like Diabetes, Hypertension, Post Covid status and Immunosuppression among the Cases and Controls involved in the study. It shows Patients with Diabetes were more in both Cases (19) and Controls (16) following which is Hypertension around 7 patients in Cases and 10 in Controls.

Figure 3: Distribution of Procalcitonin Levels among Patients in Study group



Above Mentioned Figure depicts Out of 160 patients involved in the study 43 nearly 27% had Procalcitonin level of 0.1 ng/mL followed by level 0.5 ng/mL among 28 patients which around 17%.

Figure 4: Distribution of Various Biochemical parameters on Day 0, 3 and 7 (Multiple Bar chart)



Out of 160 participants 50% shows dramatic response on Day 03 in biochemical parameters like Serum Amylase, Lipase, CRP and BUN followed by 80% on Day 07 irrespective of Antibiotic usage.

DISCUSSION

The present Randomized controlled study involves the use of procalcitonin levels to evaluate the dose of antibiotics in self-limiting pancreatitis among 160 patients in KAPVGM. Among the selected participants 5 were above 50 years of age and remaining 155 were between 20 – 49 years of age. The 160 patients were divided into 82 Cases and 78 Controls. Totally 140 Males and 20 Females were involved in the study. Out of which 12 Females and 70 Males were designated as Cases and remaining as Controls by Randomization. All the patients were presented with Abdominal pain. 137 patients had Nausea and Vomiting. Out of 160 patients 6 had symptoms of Obstruction/Distension. The radiological Investigation shows Inflammation in all 160 patients, Calcification in 4 patients and Free fluid in 5 patients. Cases were subjected to conservative management which entitled with iv fluids and analgesic therapy such as non-steroidal anti-inflammatory agents, narcotic analgesic with no antibiotic usage. While the control group were provided with a broad-spectrum antibiotic, along with supportive therapy. Irrespective of Antibiotic therapy 160 patients involved in the study showed dramatic response in Biochemical parameters Serum Amylase(U/L), Serum Lipase(U/L), CRP (mg/dl), & BUN (mg/dl) which is 50% on Day 03 and 80% on Day 07. 5% of patients in study group (cases) showed leucocytosis, increased CRP levels and features of sub-acute obstruction and pleural effusion. 20% shows an equivocal response & they are subjected to antibiotic therapy with followed up for 6 months. 30% of the patients irrespective of etiology had associated comorbid factors such as Diabetes, Hypertension, post covid status sequelae and Immunocompromised. Hence, showed poorer prognosis despite antibiotic therapy. In this study Procalcitonin level were used to evaluate the dose of Antibiotics in self-limiting Pancreatitis. The result shows out of 160 patients involved in the study 43 (27%) had Procalcitonin level of 0.1 ng/mL followed by level 0.5 ng/mL among 28 patients which around 17% and only 1 patient had level 1.0 and 0 respectively.

CONCLUSION

The outcome of our study showed that irrespective of etiology, acute pancreatitis is a self-limiting disorder which resolves due to natural healing because of systematic immune response sequelae. When it is associated with comorbid condition such as diabetes mellitus, systemic hypertension, post covid sequelae or immunosuppressive states, then the prognosis is poor. Hence, conservative management and supportive therapy applied to such patients on the basis of segregation by applying our concert of procalcitonin level at the time of admission. Procalcitonin level basis of treatment algorithm reduces unnecessary hospital usage of antibiotics. This may also reduce the evolution of antibiotic resistance among general population for future medical therapy. Overexposure to drug related toxicities leading to hepatic and renal disorders maybe avoided. Recurrent pancreatic attacks in patient with comorbid condition maybe correctly segregated and managed from the onset to avoid morbidity and mortality.

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