

*Original Research article***Spectrum of Microbiological Infections in Acute Necrotizing Pancreatitis**Sadashiv Chaudharai¹, Rajeev Karvande², Pravin Shinde¹, Amar Kambale³

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Abstract:**Background**

Acute Necrotizing Pancreatitis (ANP) can have varied presentation from mild inflammation to widespread necrosis which can get secondarily infected. Infections complicating necrotizing pancreatitis are often polymicrobial and involve both aerobic and anaerobic bacteria as well fungi. In the present study, we are trying to find out spectrum of bacterial and fungal infections and their antimicrobial susceptibility

Methods

In this prospective observational study conducted over 18 months, we have studied 42 patients with ANP who have undergone intervention. Cultures were obtained from the necrosium at the time of intervention. Obtained results were analysed.

Results

Out of 42 cases, 30 showed presence of bacterial infections and 6 showed presence of fungal infections. Gram negative Bacilli infections were predominant with maximum sensitivity to colistin.

While Gram Positive Bacilli infections showed maximum sensitivity to Meropenem.

Conclusion

We conclude that Necrosis in Acute Pancreatitis frequently shows presence of bacterial and fungal infections. Gram Negative Bacilli is the most common Bacterial infections.

Meropenem is the best empirical antibiotic for ANP.

Keywords: Polymicrobial infection, antimicrobial susceptibility, Necrosium, Colistin, Meropenem.

Introduction:

Acute pancreatitis is defined as an acute condition presenting with abdominal pain, a threefold or greater rise in the serum levels of the pancreatic enzymes amylase or lipase, and/or characteristic findings of pancreatic inflammation on contrast enhanced CT.

Acute necrotizing pancreatitis is one of the most common disease of gastrointestinal tract leading to tremendous emotional, physical and financial human burden.(1) Acute pancreatitis is an inflammatory process of the pancreas, with variable involvement of peripancreatic tissues and remote organ systems. In 80% of the cases the disease is mild,(2)(3) with interstitial edema, and leads to recovery within days or weeks. Severe forms, characterized by local or systemic complications, may on the other hand be very demanding and are associated with severe morbidity and even death, in up to 20%.

The natural course of severe acute pancreatitis progresses in two phases. The first 2 weeks are characterized by the systemic inflammatory response syndrome resulting from the release of inflammatory mediators. In patients with acute necrotizing pancreatitis (ANP), organ failure is common and often occurs in the absence of infection. In addition to organ dysfunction, general derangements include hypovolemia, a hyperdynamic

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circulation, fluid loss from the intravascular space, and increased capillary permeability. The second phase, beginning approximately 2 weeks after the onset of the disease, is dominated by sepsis-related complications resulting from infection of pancreatic necrosis. This may be associated with multiple systemic complications, such as pulmonary, renal, and cardiovascular failure.⁴

In the natural course of the disease, infection of pancreatic necrosis occurs in 40% to 70% of patients, and it has become the most important risk factor of death from ANP. Of patients who die of acute pancreatitis, more than two thirds of deaths are due to late septic organ complications.

Antibiotic treatment with agents penetrating well into the pancreas has been shown to prevent infection in severe acute pancreatitis and to lower the death rate.^{5,6}

Infections complicating necrotizing pancreatitis are often polymicrobial and involve both aerobic and anaerobic bacteria.^{7,8} The causative organisms most commonly originate from the gastrointestinal tract and include *Escherichia coli*, *Klebsiella* spp, *Enterobacter* spp, *Proteus* spp, *Pseudomonas aeruginosa*, *Bacteroides* spp, and *Clostridium* spp, and the enterococci.⁵

Consequently, patients with severe necrotizing pancreatitis are often administered prophylactic broad-spectrum antimicrobial agents with the aim of reducing the incidence of pancreatic and peripancreatic infections, and even reducing mortality.

As antimicrobial treatment is empirical, the choice of an appropriate regimen is based on expected pathogens and their predicted susceptibilities. However, the benefits of prophylactic antimicrobial therapy in necrotizing pancreatitis have not been demonstrated consistently. Recently, *Candida* species and Gram-positive organisms have been isolated in greater numbers, which may possibly be linked to the widespread use of prophylactic antimicrobial agents.⁹

Aim of this study to know spectrum of bacterial infections, their susceptibility pattern and spectrum of

fungal infections to determine best empirical antibiotic and antifungal treatment for case of acute necrotizing pancreatitis.

Infected pancreatic necrosis should be suspected in patients with prolonged fever, elevated WBC counts or progressive clinical deterioration.

Material and methods

This prospective observational study was conducted at tertiary care institute over the period of 18 months we studied 42 patients with Acute necrotising pancreatitis who have undergone intervention. All the patients above 18 yrs of age having acute necrotising pancreatitis was included in study. Patients having immunocompromised status or on chemotherapy was excluded from study. Clinical symptomatic improvement observed after intervention and data collected as serial WBC counts, Residual scans, microbiological and fungal culture and sensitivity pattern, antibiotics and antifungal given. Patients assessed for clinical improvement at the time discharge /death, Antibiotics given, residual scans.

Results

The present study was conducted in the department of General surgery at a tertiary care centre on n= 42 patients who diagnosed as acute necrotizing pancreatitis and undergone intervention. In this study age of the patients ranging from 29 – 61 years with average being 46.83 years. There is no specific age group affected shown by this study. In our study out of 42 cases studied 32 patients are male and 10 females. 76.2% of these cases were male and 23.8 % were female.

In our study the duration of disease that is starting of complaint to the time at presentation at admission. Duration of disease was ranging from 7.00 – 21.00 days with average being 14.07 days.

Out of 42 cases 11 patients found co-morbidities from which 9 patients had Diabetes and 2 had Hypertension. That is 81.8% of the cases had Diabetes and 18.2 % of cases had hypertension.

Out of total 42 cases 33 patient undergone Pigtail insertion and 9 patients had Open Necrosectomy. 78.6 % of the cases had Pigtail insertion whereas 21.4 % of the cases had Open Necrosectomy.

In our study specimen sent as pancreatic necrosom / collection obtained after intervention on their first culture observed. Total 42 cases specimen sent out of which 30 cases showed organism growth on culture and 12 cases had no growth on their culture. 71.4% of these cases showed growth of organism on specimen and 28 % had no growth. Out of 30 cases which showed growth on their culture 22 cases showed gram negative organism and 08 cases were gram positive organism that is 73.3 %showed Gram negative organism and 26.7 % showed gram positive organism. In Gram Negative organism out of total 22 cases most commonly found organism is Escherichia Coli. 10 cases of Escherichia coli, 08 cases of Pseudomonas, 2 cases of klebsiella and 2 cases of Acinetobacter found. In Gram Positive organisms out of total 8 cases 5 cases were Enterococcus; 2 cases were staphylococcus and 1 case of streptococcus found. (table)

Out of total 42 cases 6 cases showed fungal culture positive and 36 patients had no growth. That is 14.3% cases had fungal culture positive. Out of 6 cases 5 were Candida and 1 case of Yeast found.

In our study Patients with Gram negative organism showed maximum sensitivity to the colistin followed by meropenem and cefuroxime. In Gram positive organisms showed maximum sensitivity towards meropenem followed by amikacin and cefuroxime.

In our study there are three empirical antibiotics studied out of 42 cases 20 cases meropenem given 12 cases cefuroxime given and 10 cases piperacillin given and results observed in comparison with symptomatic improvement, Infective complication and Outcome of patients. table

Discussion

Infections complicating necrotizing pancreatitis are often polymicrobial and involve both aerobic and

anaerobic bacteria.^{10,11} The causative organisms most commonly originate from the gastrointestinal tract and include Escherichia coli, Klebsiella spp, Enterobacter spp, Proteus spp, Pseudomonas aeruginosa, Bacteroides spp, and This study showed that meropenem had good symptomatic improvement, less infective complication and good outcome of diseases. Clostridium spp, and the enterococci^{12,13} in our study 73.3 %showed Gram negative organism and 26.7 % showed gram positive organism.

Recently, Candida species and Gram-positive organisms have been isolated in greater numbers, which may possibly be linked to the widespread use of prophylactic antimicrobial agents. (96) in our study we found to have fungal growth on cultures in 6 patients that is 14.3% cases had fungal culture positive.

Consequently, patients with severe necrotizing pancreatitis are often administered prophylactic broad-spectrum antimicrobial agents with the aim of reducing the incidence of pancreatic and peripancreatic infections, and even reducing mortality.^{7,14-17} As antimicrobial treatment is empirical, the choice of an appropriate regimen is based on expected pathogens and their predicted susceptibilities.¹⁵ However, the benefits of prophylactic antimicrobial therapy in necrotizing pancreatitis have not been demonstrated consistently.^{18,19} In the last decade, there have been four sequential met analyses performed almost two-yearly which show contrasting results over the same, expanding cohort.^{7,14-16,20}

While different clinical evaluations of the efficacy of various antibiotics in preventing/delaying infection associated with necrotizing pancreatitis show conflicting and contradictory outcomes, 4 meta-analyses have suggested a decrease in infection-related morbidity, although their authors have reached differing conclusions. For better understanding of the utility of the same, Dellinger et al conducted A multicentre, prospective, double-blind, placebo-controlled randomized study set in 32 centres within North America and Europe.⁹ Our study showed less

infective complications in patients receiving Meropenem.

Conclusion

Gram negative organism was commonly isolated organism in specimen sent for culture. E coli was the most commonly found organism in culture among gram negative organisms. Enterococcus is most commonly found organism among gram positive organisms. Fungal culture showed most commonly Candida spp. Meropenem is the best empirical antibiotic for acute necrotizing pancreatitis. Gram negative organisms showed maximum sensitivity towards colistin and gram positive organisms towards meropenem.

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