Section: General Medicine

Original Research Article

PREVALENCE, RISK FACTORS AND CLINICAL PROFILE OF CLOSTRIDIOIDES DIFFICILE INFECTION IN ANTIBIOTIC-ASSOCIATED DIARRHOEA: A PROSPECTIVE OBSERVATIONAL STUDY FROM NORTHERN KERALA

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ABSTRACT

Background: Clostridioides difficile infection (CDI) is a major cause of antibiotic-associated diarrhoea (AAD), particularly in elderly hospitalized patients. Indian data on CDI from semi-urban regions remain limited.
Objectives: To determine the prevalence of CDI among patients with antibiotic-associated diarrhoea and to identify associated risk factors and clinical characteristics.
Materials and Methods: This prospective observational study was conducted in a tertiary care hospital in Northern Kerala during a period of 15 months. A total of 125 hospitalized adult patients with diarrhoea following antibiotic exposure were included. Stool samples were tested for glutamate dehydrogenase antigen and Clostridioides difficile toxins A and B using a rapid immunoassay. Statistical analysis was performed using SPSS version 20.0.
Results: The prevalence of CDI was 17.6%. CDI was more common among males (68.2%), with a mean age of 73.9 ± 10.02 years. Significant associations were observed with advanced age, exposure to broad-spectrum antibiotics—particularly glycopeptides, fluoroquinolones, carbapenems and lincosamides—acid suppressive therapy, steroid use and Ryle's tube feeding. Both metronidazole and vancomycin were associated with favourable clinical outcomes.
Conclusion: CDI is a significant cause of antibiotic-associated diarrhoea among elderly hospitalized patients. Early identification and judicious antibiotic use are essential to reduce morbidity.
Keywords: Clostridioides difficile, antibiotic-associated diarrhoea, CDI, risk factors, India.

INTRODUCTION

Clostridioides difficile is a gram-positive, anaerobic, spore-forming bacillus and the leading identifiable cause of antibiotic-associated diarrhoea and pseudomembranous colitis. CDI is associated with prolonged hospital stay, increased healthcare costs and mortality, especially among the elderly. While CDI has been extensively studied in Western populations, Indian data—particularly from semi-urban healthcare settings—remain sparse. This study aimed to evaluate the prevalence, risk factors and clinical profile of CDI in hospitalized patients with antibiotic-associated diarrhoea in Northern Kerala.

MATERIALS AND METHODS

Study design and setting: A prospective observational study conducted at KIMS Al-Shifa Healthcare Pvt Ltd, Perinthalmanna, Kerala.
Study population: Hospitalized adults presenting with diarrhoea and a history of antibiotic exposure

within the previous three months.

Inclusion Criteria

- Hospitalized Adults with prior antibiotic exposure with ≥3 loose stools per day
- Recent antibiotic exposure

Exclusion Criteria

- Inflammatory bowel disease
- Paediatric patients
- Patients unwilling to participate

Sample Size: A total of 125 patients were enrolled.

Data Collection: Demographic data, clinical features, antibiotic exposure, comorbidities and laboratory parameters were recorded using a structured proforma.

Laboratory methods: Fresh stool samples were tested using **C. DIFF QUIK CHEK COMPLETE**, detecting glutamate dehydrogenase antigen and toxins A and B.

Statistical Analysis: Data were analysed using SPSS version 20.0. Categorical variables were analysed using the chi-square test, and continuous variables using the independent t-test. A p-value <0.05 was considered statistically significant.

RESULTS

Prevalence of CDI

Out of 125 patients, 22 were positive for Clostridioides difficile toxins, giving a prevalence of **17.6%**.

The mean age of CDI-positive patients was **73.9 ± 10.02 years**. Males constituted **68.2%** of CDI cases.

Table 1: Distribution of age group among CDI positive patients

Age in years	No. of patients	%
<20	0	0
20 – 29	0	0
30 - 39	0	0
40 - 49	0	0
50 -59	3	13.6
60 - 69	5	22.8
70 – 79	7	31.8
More than 80	7	31.8
total	22	100

There was a significant increase in the incidence of CDI with age

Table 2: Mean age group among subjects who are CDI positive

Mean age	Mean Age	SD	P value
Negative	57.94	20.39	0.001*
Positive	73.90	10.02	

Treatment outcome

Table 3: Distribution of symptoms among subjects who are CDI positive

	No	Yes
semi solid	12(54.5)	10(45.5)
watery	12(54.5)	10(45.5)
mucus	20(90.9)	2(9.1)
bloody	22(100)	0
abdominal pain	18(81.8)	4(18.2)
malaise	10(45.5)	12(54.5)
fever	13(59.1)	9(40.9)

Treatment	Patients (%)	Outcome
Metronidazole	11 (50)	Improvement
Vancomycin	11 (50)	Improvement

DISCUSSION

Clostridiodes difficile diarrhea is an emerging healthcare threat in our country. It is one among the commonest nosocomial infections that results in increase in the cost of healthcare services and prolongation of hospital stay along with increase in morbidity and mortality of the patients.

On assessing the demography of the study population, 52% were males and 48% were females (65 males and 60 females).

The mean age group of subjects involved in study was 60.95±19.45 years. The mean age group of males are 61.65±20.30 years and females are 60.20±18.64 years. Maximum no. of cases belong to 70 - 79 years of age group.

Mean age of CDI group was 73.90±10.02 years which showed statistically significant association with CDI infection (p= 0.001). Maximum number of CDI positive cases reported to the study belong to more than 70 years.

Among the study group, major presentation was semisolid stools (51%) with increased stool frequency whereas in CDI group majority of them presented with loose watery stools (54%). A few presented with mucoid stools, were none of them had bloody stools. 30- 40% of the subjects presented with fever. Mean pulse rate found among the subjects in CDI positive group is 94.22±13.78 beats/ minute. Mean temperature found among the CDI group is 100.5 degree farenheit.

Among the study group, 17.6% showed positivity for AntiGDH antigen which shows the presence of Clostridiodes difficile in their gut. 7.2% showed positivity for toxins, which indicate the active invasion and multiplication of the bacteria that is, 9/17(52.9%) turned out to be both toxin and GDH positive in our study group.

Glycopeptides followed by polypeptides, clindamycin, fluroquinolones and aminoglycosides were associated with development of CDI. The strength of association between carbapenams, polypeptides, fluroquinolones, lincosamides, glycopeptides, macrolides, penicillins and aminoglycosides were highly significant.

Cephalosporins and betalactamase inhibitor were also associated with CDI infection, but the strength of association in this study was insignificant. Acid suppressing agents, Steroids and RT feeding showed statistically significant association with CDI, but as the patients were simultaneously on antibiotics along with the above mentioned, it was tedious job to assess the relationship of each ones.

Limitations

- Single-centre study
- Moderate sample size
- Lack of molecular strain typing

CONCLUSION

This study shows a very significant association between age and increased incidence of CDI. Hence the use of broad spectrum if antibiotics should be thoroughly scrutinised in the elderly Most of the patients had an average of 7-10 days of exposure to each antibiotic class, thus inceasing the prevalence of CDI. Hence antibiotics should be de escalated as per culture sensitivity report once stable. Antibiotics should be used with great care and broad spectrum antibiotics, if employed, should be followed up by surveillence for CDI. Stool testing for CD toxin may be done in those at higher risk for CDI after antibiotic use- this is to anticipate CDI and treat early.

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