DOI: https://doi.org/10.53350/pjmhs22165162

ORIGINAL ARTICLE

Role of Probiotics in Reducing the Frequency of Necrotizing Enterocolitis in Adults

ZAHOOR AHMED SHAH[1], SYEDDA ALIA HASSAN BUKHARI[2], JALAL KHAN[3], TUBA RASHEED[4]
[1,3]Assistant Professors, Department of Medicine, Bolan Medical College, Quetta
[2]Female Medical Officer, RHC Chattar No.2, Bagh Azad Kashmir AJK
[4]3rd Year MBBS Student, Bahria University of Health Sciences, Karachi
Correspondence to Dr. Zahoor Ahmed Shah, E-mail: drzshah@hotmail.com Cell: 0310-8008868

ABSTRACT

Aim: To assess the role of probiotics in reducing the frequency of necrotizing enterocolitis in adults.
Study design: Retrospective study
Place and duration of study: Department of Medicine, Bolan Medical College Quetta from 1st July 2021 to 31st December 2021.
Methodology: Forty cases of adult necrotizing enterocolitis were examined clinically as well as through radiological, biochemical and microbiological testing were enrolled. The cases were categorized according to the severity of their disease and probiotics were used for a month in less severe cases for analyzing its role in reducing necrotizing enterocolitis with a one-month follow-up.
Results: The mean age of the patients was 49.2±5.36 years with 27 cases of males in comparison to 13 cases of females. Metabolic acidosis and respiratory acidosis were presented only in stage 2 and 3 each respectivelyAround 43% of cases reported reduction in venous ammonia after probiotic usage while 21% of the patients claimed betterment in their cognition.
Conclusion: Probiotics have an efficient role in reducing ammonia production and improving cognition in adult necrotizing enterocolitis.
Key words: Necrotizing, Enterocolitis, Probiotics

INTRODUCTION

Early age groups are often affected by a deadly intestinal disease known as necrotizing enterocolitis (NEC). Despite being related young age; this disease has also been reported in adults. The clinical manifestations of NEC are associated with inflammation of intestine with mucous production, epithelial-cell death perforation of the transmural intestinal walls in addition to the leakage of fluids present in the intestine. In lethal cases this results into septicemia and multiple organ failure. The only available treatment is the removal of the necrotizing intestine. The clinical symptoms of NEC are not specified with variability in temperature, vital-parameters, intolerance in feeding as well as distended abdominal-wall and bloody production of stool[1].

The term adult-necrotizing enterocolitis (ANEC) has been used foe representing similar condition and clinical presentation in adults. It also causes bowel necrosis and is also termed as Drambrand and Pigbel[2-4]. The prevalence of the NEC has been reports as seven percent with a mortality reported as 20 to 30%[5]. However, the mortality linked with adults is lower as it is a rare condition and only few cases are reported in the present literature. Out of the main causes of ANEC mesenteric-ischemia is also one of the rare causes of ANEC. The surgery of ANEC is recommended in advances cases however with a poor health prognosis[6-9].

The protective nature of the probiotics has been used for preventing necrotizing enterocolitis in young as well as adult cases. However, its efficacy in case of adults is not much detailed. A study detailed the use of probiotics for four years and presented positive outcomes[10,11]. However, this study was not conducted in adults. The present study was designed to assess the role of probiotic in necrotizing enterocolitis in adults.

This study aimed for providing better healthier options for treating ANEC and save many lives from lethal complications of this disease.

MATERIALS AND METHODS

This retrospective study was conducted at Department of Medicine, Bolan Medical College Quetta from 1st July 2021 to 31st December 2021 and 40 patients were enrolled suffering from ANEC. The sample size was calculated by using 5% margin of error and 97% confidence interval. As the prevalence of ANEC is very low therefore majority of data was not possible from one center therefore various national hospitals and clinics were requested for sharing their data for collection of information. The study was approved from ethical review board and each patient written consent was already available in their medical file. The age of the patients was between 45-55 years. Each patient was clinically diagnosed and evaluated for the ANEC. Clinical symptoms included presentation of the patient in emergency settings with severe abdominal pain and bloody diarrhea accompanied with vomiting. Radiological imaging (x ray or CT scan) was immediately performed in each patient and evaluation for perforated peritonitis was made hematological, biochemical testing was performed including white blood cell count, albumin and hemoglobulin levels within each patient.. Any related co morbidities were enlisted and all the demographic as well as clinical information was recorded on a well-organized questionnaire based proforma. The microbial flora was examined from stool test and specified. Probiotic treatment in accordance to the microflora presented was started in each of the patients for a month and its outcomes were followed with ammonia lab identification in addition to other tests. The microbial infection was detected by culturing and use of polymerase chain reaction. Hematological, biochemical testing was performed including white blood cell count, albumin and hemoglobulin levels within each patient. Data was analyzed by using SPSS version 25.0.

Received on 02-01-2022
Accepted on 10-05-2022

RESULTS

This study was conducted on patients between 45-55 years. The mean age of the patients was 49.2±5.36 years. Majority of the patients were between the age group of 51-55 years with 27 cases of males in comparison to 13 cases of females reported (Table 1).

Table 1: Distribution of age and gender within cases (n=40)

Variable	No.	%age
Age (years)		
45-50	19	47.5
51-55	21	52.5
Gender		
Male	27	67.5
Female	13	32.5

Within the total cases there were 10(25%) cases suspected for ANEC while 26(65%) were having definite ANEC and 4(10) cases were having advances ANES. Hypotension followed by

tachycardia was observed highest in stage 2 and also in stage 1 and 3. Similarly abdominal distension was highest in stage 2 and 3 while metabolic acidosis and respiratory acidosis was presented only in stage 2 and 3 each respectively (Table 2).

White blood cell count was higher only in 11 cases (27.5%) while lower levels of albumin and hemoglobulin were observed in 20% and 37.5% cases respectively (Table 3).

In this study the role of probiotics was seen and found that 43% of reduction in venous ammonia was noticed while 21% of the patients claimed betterment in their cognition. An improvement in the intestinal mucosal barrier was noticed in 19% of the cases (Fig 1). It is important to note that probiotic long term role was only measured in the stage 1 and 2 cases and stage 3 cases were too risky for such analysis due to their advancement in disease and required surgical interventions.

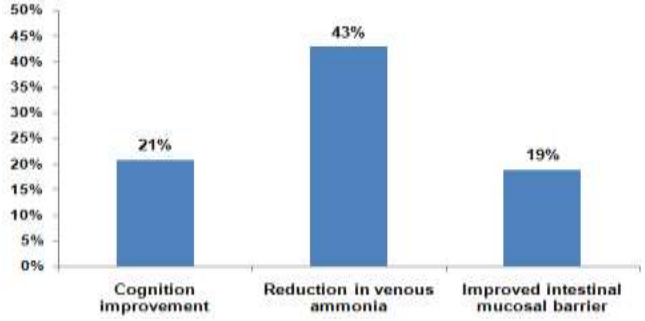
Table 2: Clinical characteristics of ANEC cases (n=40)

Clinical characteristics	ANEC			
	Stage 1 (n=10)	Stage 2 (n=26)	Stage 3 (n=4)	P value
Tachycardia	5 (50%)	21 (80.7%)	3 (75%)	0.049
Abdominal distension	4(40%)	26 (100%)	4 (100%)	0.65
Bloody Stools	1(10%)	26 (100%)	4 (100%)	0.03
Metabolic Acidosis	-	19 (73.07%)	-	-
Respiratory acidosis	-	-	4 (100%)	-
Ascites	-	2 (7.69%)	2 (50%)	0.03
Hypotension	6 (60%)	26 (100%)	4 (100%)	0.54
Diabetes	-	-	1 (25%)	-
Dilated bowel loops	4 (40%)	1 (3.84%)	-	0.52

Table 3: Frequency of biochemical parameters

Biochemical variables	No.	%age
WBC Count>11 x10^9/L	11	27.5
Albumin <3.4g/dl	8	20.0
Hemoglobulin <11.5 g/dl	15	37.5

Fig. 1: Role of probiotics in ANEC case management



DISCUSSION

Adult necrotizing enterocolitis has a reduced chance of mortality when compared with neonatal prevalence but can lead into critical morbidities. Various microorganisms have been found to be associates as the agents for causing ANEC in adults. The present study enrolled 40 patients after involving medical record from various patients enrolled nationally. ANEC has been presented in neonates and infants but it is rarely presented in adult cases as also reported in the present study[12]. The frequency of males is higher in the current study than females. Boley et al[12] have also reported that ANES has been seen more frequently in male gender than females due to their higher outdoor exposure and microflora influx. The mean age of adult patients was within late forty years. This age has been reported as at a high risk of development of ANEC and other bowel diseases[13].

Probiotics have been reported for its effective role in reducing the NEC in various ages with a higher efficiency in neonates and children[14]. The role of probiotics is specific to the microorganism species and can vary with variability in the microflora[15]. Probiotics have different site of actions and act on a microorganisms by difference specified mechanism. The involvement of toll like receptors is greatly important as these receptors specifically identify the target microorganisms[16].

The gut in cases of infections has the ability of inflammation. Probiotics have the role in reducing the inflammation and increasing the absorbance capacity through the intestinal epithelial cells[17,18]. A wide variety of probiotics have been studied including *Bacillus* spp, *Lactobacillus* spp and *Saccharomyces* spp[19]. The course of the probiotics has been defined for a month reported by Costeloe et al[20]. Similar was adapted strategy in the current research.

CONCLUSION

Probiotics have an efficient role in reducing ammonia production and improving cognition in adult necrotizing enterocolitis.
Conflict of interest: Nil

REFERENCES

1. Fick KA, Wolken AP. Necrotic jejunitis. Lancet 1949;1:519-21.
2. Henry MC, Lawrence Moss R. Surgical therapy for necrotizing enterocolitis: Bringing evidence to the bedside. Semin Pediatr Surg 2005; 14:181-90.
3. Katara AN, Chandiramani VA, Soman R, Bhaduri A, Desai DC. Necrotizing enterocolitis in adults: A study of four cases. Indian J Surg 2004;66:115-8.
4. Schnabl KL, Van Aerde JE, Thomson AB, Clandinin MT. Necrotizing enterocolitis: A multifactorial disease with no cure. World J Gastroenterol 2008;14:2142-61.
5. Reinus JF, Brandt LJ, Boley SJ. Ischemic diseases of the bowel. Gastroenterol Clin North Am 1990;19:319-43.
6. Bellodas Sanchez J, Kadrofske M. Necrotizing enterocolitis. Neurogastroenterol Motil 2019;31: e13569.
7. Battersby C, Longford N, Mandalia S, Costeloe K, Modi N. Incidence and enteral feed antecedents of severe neonatal necrotising enterocolitis across neonatal networks in England, 2012-13: a whole-population surveillance study. Lancet Gastroenterol Hepatol 2017;2:43-51.
8. Acosta S, Ogren M, Sternby NH, Berqvist D, Björck M. Fatal nonocclusive mesenteric ischemia: Population-based incidence and risk factors. J Intern Med 2006;259:305-13.
9. Walsh MC, Kleigman RM. Necrotizing enterocolitis: Treatment based on staging criteria. Pediatr Clin North Am 1986;33:179-201.
10. Smerud M, Johnson CD, Stephens DH. Diagnosis of bowel infarction: A comparison of plain films and CT scans in 23 cases. AJR Am J Roentgenol 1990;154:99-103.
11. Bakal CW, Sprayregen S, Wolf EL. Radiology in intestinal ischaemia: angiographic diagnosis and management. Surg Clin North Am. 1992; 72:125-41.
12. Boley SJ, Sprayregan S, Siegelman SS, Veith FJ. Initial results from an aggressive roentgenological and surgical approach to acute mesenteric ischaemia. Surgery 1977; 82: 848-55.
13. Zachariah SK. Adult necrotizing enterocolitis and non occlusive mesenteric ischemia. J Emerg Trauma Shock 2011; 4(3): 430-32.
14. Cristina CijevschiPrelipcean, Cătălina Mihai, et al. What is the impact of age on adult patients with inflammatory bowel disease? Clujul Med 2013; 86(1): 3-9.
15. Underwood MA. Probiotics and the prevention of necrotizing enterocolitis. J Pediatr Surg 2019; 54: 405-12.
16. Pammi M, Cope J, Tarr PI, Warner BB, Morrow AL, Mai V, et al. Intestinal dysbiosis in preterm infants preceding necrotizing enterocolitis: a systematic review and meta-analysis. Microbiome 2017;5:31.
17. McMurtry VE, Gupta RW, Tran L, Blanchard EE, 4th, Penn D, Taylor CM, et al. Bacterial diversity and Clostridia abundance decrease with increasing severity of necrotizing enterocolitis. Microbiome 2015;3:11.
18. Jangi S, Lamont JT. Asymptomatic colonization by Clostridium difficile in infants: implications for disease in later life. J Pediatr Gastroenterol Nutr 2010;51:2-7.
19. Mathipa MG, Thantsha MS. Probiotic engineering: towards development of robust probiotic strains with enhanced functional properties and for targeted control of enteric pathogens. Gut Pathog 2017;9:28.
20. Costeloe K, Bowler U, Brocklehurst P, Hardy P, Heal P, Juszczak E, et al. A randomised controlled trial of the probiotic Bifidobacterium breve BBG-001 in preterm babies to prevent sepsis, necrotising enterocolitis and death: the Probiotics in Preterm infantS (PiPS) trial. Health Technol Assess 2016;20:1-94.