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Clinical profile and etiology of diarrhea more than 2 weeks duration in children aged 1 month to 12 years of age in a Pediatric tertiary care centre in Tamil Nadu

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Abstract
Introduction: *Diarrhoea is the second leading cause of death in children under five years old. Chronic Diarrhoea has a variety of etiologies; a specific diagnosis cannot be established in all cases.*
Objectives: *The aim of this study is to determine the etiology and analyze the clinical profile of diarrhoea in children aged 1 month to 12 years lasting more than two weeks in a tertiary care centre.*
Methods: *This was a prospective study done in children in study age group attending Gastroenterology OPD or admitted in medical /gastroenterology ward of Institute of Child Health and Hospital for children, Egmore, Chennai, satisfying the inclusion criteria during October 2016 to September 2017.*
Results: *Mean age of onset of chronic diarrhoea in this study was 23 months. Chronic diarrhoea was more common in children less than 1yr of age (48.8%). Mean duration of diarrhoea in this study was 93.74 days. 62.7% of study population were malnourished, Vitamin A deficiency detected in 9.6%, anaemia in 69.8% of children and hypoproteinemia in 25.65%. Urinary sepsis detected in 9.3% of study population. Commonest cause of chronic diarrhoea in our study was intestinal infections (25.58%), followed by cow's milk protein allergy (20.93%) and inflammatory bowel disease (4.65%).*
Conclusion: *Chronic diarrhoea was more common in children less than 1yr of age, 62.7% of study population was malnourished and the commonest etiology was intestinal infections followed by cow's milk protein allergy.*
Keywords: *Diarrhoea, chronic, etiology, malnutrition, anthropometry, clinical profile.*

Introduction

Diarrhoea is the second leading cause of death in children under five years old, and is responsible for killing around 525000 children every year. Diarrhoea is defined as the passage of three or more loose or liquid stools per day. Acute diarrhea

usually lasts 1 to 2 weeks. Diarrhea lasting more than 14 days may be classified into 1. Acute onset persistent diarrhea[1]. In this condition diarrhoeal episode begins abruptly, but persistent beyond 14 days and can be simple persistent without weight loss or persistent protracted with weight loss[2] and 2. Insidious Onset Chronic Diarrhoea: Diarrhoea of more than 14 days duration occurring in a child with some basic defects either in the GI tract, immune system or other organs.

Chronic childhood diarrhoea has a variety of etiologies; a specific diagnosis cannot be established in all cases. Identifying specific etiology may be necessary by appropriate investigations so that therapy can be instituted to reduce morbidity and mortality.

Aim

The aim of this study is to determine the etiology and analyze the clinical profile of diarrhoea in children aged 1mon to 12yrs lasting more than two weeks in a tertiary care centre.

Materials and Methods

This was a prospective study done in children in study age group attending gastroenterology

OPD or admitted in medical /gastroenterology ward of Institute of Child Health and Hospital for children, Egmore, Chennai, satisfying the inclusion criteria during October 2016 to September 2017. All children aged 1 month to 12 years presenting with diarrhoea for more than 2 weeks attending the hospital were included in the study and children with an established diagnosis and on treatment were excluded.

After obtaining an informed consent from the parents/guardian, eligible children were enrolled in the study. This study protocol was reviewed and approved by the ethical review committee. Children were subjected to complete physical examination and assessments of anthropometry. Anthropometry is a simple valuable tool and the gold standard for evaluating the nutritional status. Weight was measured using a beam scale of Salter type scale. The scale was checked with standard weight and zero error was corrected to the nearest value of + 20 gms. Below the age of 2 years a horizontal measuring rod (or) infantometer was used to measure height. Height measured in lying down posture was called length. Beyond the age of two years, a vertical measuring rod or stadiometer was used. All these children had basic investigations like CBC, peripheral smear, blood sugar, renal and liver function tests, serum Protein/Zinc/electrolytes, urine analysis, urine culture and sensitivity, blood cultures, X-ray chest, USG, HIV, stool examination were done in all children.

Second line investigations include upper GI endoscopy, barium contrast studies and colonoscopy for cases suspected to have tuberculosis or inflammatory bowel disease and sigmoidoscopy and biopsy in case of cow milk protein allergy.

Results

Mean age of onset of chronic diarrhoea in our study was 23 months(1month to 120 months) and children aged <1 year constituted 48.8%, 1 to 5 year 39.5% and 11.7% were above 5 years of age, 58.1% were male and 41.9% were female, with male /female ratio of 1.4:1

9(20.9%) children belonged to urban area and 34(79.1%) belonged to rural area. In our study the mean duration of diarrhoea was 93.74 days, ranging from 18 - 420 days

In this study 18(39.5%) children had exclusive breast feeding upto 6 months and 17 (41.8%) breast fed less than 6 months. 13children (30.2%) had Cow's milk exposure before 1 yr of age. Table 1 depicts the nutritional status of the study population.

In this study 9 (20.9%) children had clinically visible glossitis, 4 children (9.3%) had Vitamin A deficiency, of which 3 had conjunctival xerosis and 1 child presented with bitot's spot, 7 children (16.2%) presented with edema, 9 children had hepatomegaly (20.9%), 2 had splenomegaly, 30 children (69.8%) are anaemic. The mean Hb was10.31 gm/dl(5.2-13.9 gm/dl). In our study 11

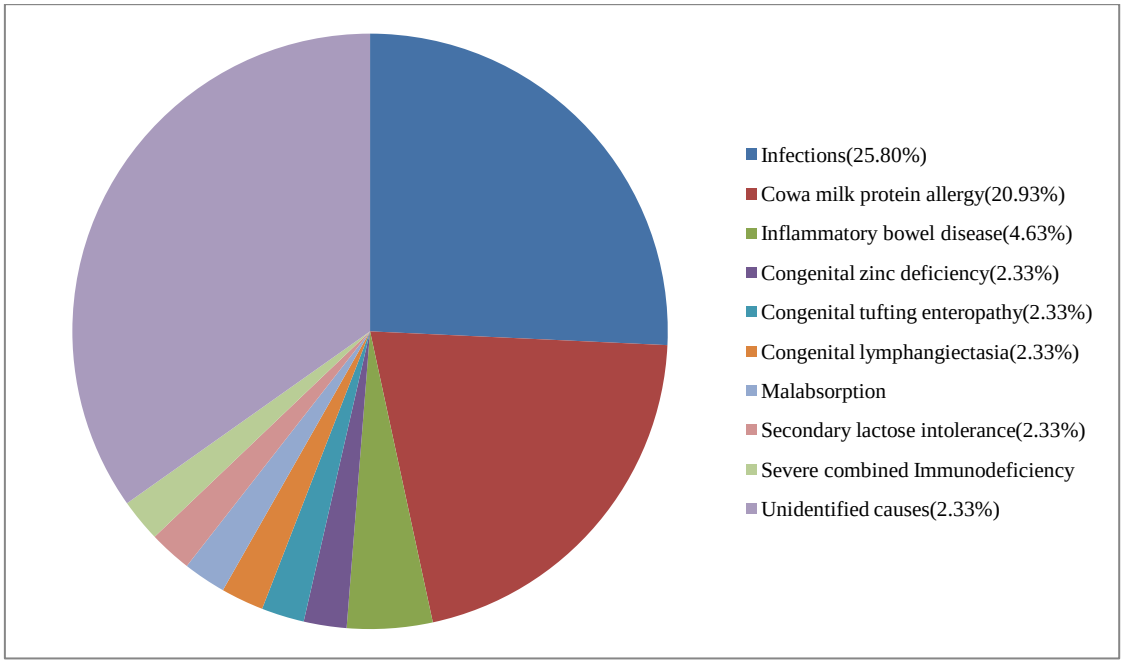
children had hypoproteinemia (25.65%), with mean serum protein of 6.30 gm/dl (3.2-8.2gm/dl). In this study stool microscopy showed Cryptosporidium parvum cyst in 3(7%), Entamoeba histolytica cyst in 3 (7%), Giardia lamblia cyst in 2(4.7%). Urine culture grew Escherichia coli in 7%, klebsiella in 2.3%. The etiological profile of diarrhea lasting more than two weeks is shown in the pie chart (Fig1). In this study out of 43 children, 42 (97.7%) children improved with treatment and 1 (2.3%) child died.

Table 1: Nutritional status of the study population

Nutritional Status	No of Babies	Percentage (%)
Severe Acute Malnutrition	16	37.2
Moderate Acute Malnutrition	8	18.5
Severe Underweight	3	7.0
Normal	16	37.3
Total	43	100.0

*WHO Growth chart was used in children below 5yrs and IAP Growth chart used in children above 5 yrs for anthropometric measurements

Fig.1: Etiological Profile of Chronic Diarrhoea



Discussion

43 children were examined during the period of study, out of 43 children 25 (58.1%) were male and 18(41.9 %) were female with a male/female ratio of 1.4:1. Lee et al[4] in their study including 27 children reported a Male: female ratio of 1.1:1. Aluntas et al[6] in their study group of 70 children found 52% female and 48% male.

Mean age of onset of diarrhoea in our study were 23 months ranging from 1 month to 120 months. Lee et al[4] in their study reported a mean age of onset of diarrhea of 16.4 months and in the study by Aluntas et al[6] the mean age of onset was 40.8 months, The mean duration of diarrhoea before admission were 93.74 days in our study compared to Lee et al[4] study where the mean duration was 66.5 days.

62.7% of children in our study were malnourished out of which 16 had severe acute malnutrition (37.2%), 8 had moderate acute malnutrition (18.5%) and 3 children aged above 5 yrs with severe underweight (7%).In the study by Aluntas et al[6] malnutrition was detected in 80% whereas Lee et al[4] found 56% children weighing below 3rd percentile on admission.

In our study out of 43 children 72.1% presented with small bowel diarrhoea and 27.9% children presented with large bowel diarrhea similar to study by Bhatnagar et a[8] where small bowel type in 103(76%), large bowel type in 19(14%) and mixed 13(9.6%).

In our study 11 children had hypoproteinemia (25.65%) and the remaining had normal serum protein (Mean protein 6.30 gm/dl ranging from 3.2 to 8.2 gm/dl). In Aluntas et al[6] study 32% children had decreased total protein. In this study 3 children grew Escherichia coli (7%), 1 child Klebsiella(2.3%) and in the remaining 39 children cultures were normal. Uma Maheswari et al[9] showed similar results in their study and identified the following pathogens, E.coli (2 cases) Klebsiella (2 cases) and candida (1 case) in urine culture

In our study stool microscopy showed Cryptosporidium parvum cyst in 3(7%), Entamoeba histolytica cyst in 3 (7%) and Giardia lamblia cyst in 2 (4.7%). In the study by Uma maheshwari et al[9] stool microscopy revealed the causative organism in 21.7% of cases and 10% of controls. E.coli was isolated in 4 (6.6%) children while shigella was isolated in only 2 (3.3%). Giardia cysts and Entamoeba trophozoites were documented in 2 (3.3%) and 4(6.6%), cases respectively.

In our study in children with diarrhoea more than 2 weeks, intestinal infections (25.58%) were established as the commonest etiology (25.80%) followed by cow's milk protein allergy (20.93%) and inflammatory bowel disease (4.65%). Congenital zinc deficiency, congenital tufting enteropathy, intestinal lymphangiectasia, malabsorbtion, secondary lactose intolerance and severe combined immunodeficiency were seen in 1 case each, but still were not able to identify a cause in 35% of children. Bhatnagar et al[3] in their study identified celiac disease(36.47%), cow milk protein allergy (11.76%), Non specific diarrhea (20%), parasitic infestation (17.64%), Intestinal Tuberculosis (2.35%), Intestinal lymphangiectasia (1.17%), HIV (1.17%), CVID(1.17%), and IBD (1.17%) as the etiology for chronic diarrhoea with similar profile as ours except for celiac which is not very common in Southern India. Aluntas et al[6] in their study demonstrated celiac disease (30%), tropical enteropathy (10%), CMPA (17%), Parasitic infestation (26%), IBD(10%), cystic fibrosis(10%), and unknown (10%). Yaccha et al[7] study, showed common causes of chronic diarrhoea as protracted diarrhea 45 (33%), celiac disease 35 (26%), parasitic infestations 13(9%), milk protein intolerance 8 (6%), intestinal tuberculosis 7 (5%). In 18 (13%) patients, cause could not be determined. Lee et al[4] study revealed the following results CMPA (8), secondary lactose intolerance (4), gastro intestinal infections (7), intestinal lymphangiectasia (2cases) and others (6cases). Abdullah et al[8] in their study identified post gastro-enteritis syndrome with or without lactose intolerance in 16 (33%); celiac disease in 10 (21%); congenital chloride diarrhoea in five (10%); glucose-galactose malabsorption and acrodermatitis enteropathica, each in three (6%); ulcerative colitis, intestinal lymphangiectasia, cow's milk protein intolerance and ataxia telangiectasia, each in two (4%); and giardiasis, immune deficiency and cystic fibrosis, each in one (2%). Rastogi et al[5] in their study results were tropical enteropathy (46.8%), irritable bowel syndrome(10.6%), giardiasis (14.8%), celiac disease(6.8%), non specific diarrhoea (21.8%). The etiology profile was comparable among most studies.

In this study out of 43 children, 42 (97.7%) children were improved with treatment and 1 child with severe combined immunodeficiency died. Lee et al[4] reported one death in his study and Abdullah et al reported 5 deaths among 48 children

Conclusions

1) Mean age of onset of chronic diarrhoea in this study was 23 months
2) Chronic diarrhoea was more common in children less than 1yr of age (48.8%), Males (58.1%) and rural children (79.1%).
3) Mean duration of diarrhoea in this study was 93.74 days, ranging from 18 - 420 days.
4) Small bowel diarrhoea (72.1%) was more common than Large bowel diarrhea (27.9%).

5) 62.7% of study population were malnourished, Vitamin A deficiency detected in 9.6%, anaemia in 69.8% of children and hypoproteinemia in 25.65%.
6) Urinary sepsis detected in 9.3% of study population.
7) Commonest cause of chronic diarrhoea in our study was intestinal infections (25.58%), followed by cow's milk protein allergy (20.93%).
8) 98% of the study population improved with treatment with one death due to Severe combined Immunodeficiency.

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