

TO STUDY THE RADIOLOGICAL CHANGES OF MALABSORPTION SYNDROME IN LACTOSE MALABSORBERS

Chitresh Kumar Banpuria¹, Dhannuram Mandavi²

¹Senior Resident, Department of Radio-diagnosis, Late Baliram Kashyap Memorial Government Medical College, Jagadapur, Chhattisgarh.

²Assistant Professor, Department of Paediatrics, Late Baliram Kashyap Memorial Government Medical College, Jagadapur, Chhattisgarh.

ABSTRACT

BACKGROUND

Lactose malabsorption is a serious issue and since malnutrition is common in our community, it was deemed worthwhile to conduct a study of lactose malabsorption in malnutrition. The problem of malnutrition in India has grown to the extent that it compels the personnel concerned with human health to pause and think for its remedy. We wanted to study the radiological changes of malabsorption syndrome in lactose malabsorbers.

METHODS

The study was conducted at outpatient department of Paediatrics in Late Baliram Kashyap Memorial Government Medical College, Jagadapur, Chhattisgarh. These cases were selected from children visiting the out patient's department, Pt. J.N.M. Medical College and Associated D.K. Hospital, Raipur, M.P. Total number of children in the present study was 67 who had no history of diarrhoea in past 15 days and in whom there was no history of worm infection. Data was collected in questionnaire. Barium-meal examination of small intestine is done. The study was conducted for a period of six months. Permission from Institutional Ethics Committee was obtained. Initially informed individual consent was taken from all the patients included in the study.

RESULTS

Radiological changes of malabsorption syndrome were seen in 37 cases out of 45 of lactose malabsorbers. Out of which, 26 cases (57.8 per cent) were having mild to moderate changes and 11 cases (22.44 per cent) showed severe changes. Barium meal was normal in 4 cases (8.88 per cent) of lactose malabsorbers. In the follow up group, out of 32 lactose malabsorbers, 27 cases (84.37 per cent) showed mild to moderate radiological evidence of malabsorption syndrome, and 4 cases (12.9 per cent) showed severe changes, total being 31 out of 32 (97.27 per cent).

CONCLUSIONS

In this study, varying grades of malnutrition between six months to 3 years of age were included for the evidence of lactose malabsorption by detecting stool pH and by doing a barium meal radiograph for evidence of malabsorption syndrome. In majority of cases, combined radiological changes of malabsorption syndrome were seen. There is no correlation of radiological evidence of malabsorption syndrome between lactose malabsorbers and absorbers.

KEYWORDS

Lactose Malabsorption, Malabsorption Syndrome, Radiological Changes.

HOW TO CITE THIS ARTICLE: Banpuria CK, Mandavi D. To study the radiological changes of malabsorption syndrome in lactose malabsorbers. J. Evid. Based Med. Healthc. 2019; 6(24), 1690-1693. DOI: 10.18410/jebmh/2019/341

BACKGROUND

One of the fundamental characteristics of living being is growth, and the innate capacity for growth can only be satisfied when the environment supplies all the requirements in correct amounts. If any one of them is missing due to some defect, a state of malnutrition will develop, and growth

will be delayed. Lactose malabsorption is of serious gravity and since prevalence of malnutrition is high in our community, it was deemed worthwhile to conduct a study of Lactose malabsorption in malnutrition. The problem of malnutrition in India has grown to the extent that it compels the personnel concerned with human health to pause and think for its remedy. The earliest literature on lactose as constituent of milk was known 345 years ago.¹ The association of lactose and other carbohydrates with the pathogenesis of diarrhoea.² Chemical synthesis of lactose had to wait approximately 300 more years after its recognition. Howarth and Long (1927) were the first persons to describe its chemical synthesis.³ The concentration of lactose in milk bears an indirect relationship to the concentration of fat and protein in different species.⁴

Financial or Other, Competing Interest: None.

Submission 13-03-2019, Peer Review 06-04-2019,

Acceptance 25-04-2019, Published 17-06-2019.

Corresponding Author:

Dr. Dhannuram Mandavi,

Assistant Professor, Department of Paediatrics,

Late Baliram Kashyap Memorial Government Medical College,
Dimrapal, Jagadapur, Chattisgarh.

E-mail: drdhannurammandavi@gmail.com

DOI: 10.18410/jebmh/2019/341



In rat mammary gland activity of galactose transferase increases throughout gestation but alpha- lactalbumin does not become evident until 18 to 19 days of gestation, and then it increases abruptly in concentration co-incident with a marked increase of lactose at the 19th to 20th day of gestation.⁵

The activity of lactase in the deeper layer of mucosa of intestine of rats, pigs and dogs and found it to be uniformly distributed in whole of the intestine.⁶

METHODS

The study was conducted at outpatient department of Paediatrics in Late Baliram Kashyap Memorial Government Medical College, Jagadapur, Chhattisgarh. These cases were selected from children out patient's Department of Pt. J.N.M. Medical College and Associated D.K. Hospital, Raipur, M.P. Total numbers of children in the present study were 67 of age 6 months to 3 years who had no history of diarrhoea in past 15 days and in whom there was no history of worm infection. The study conducted for a period of six months. Permission from Institutional Ethics Committee was obtained. Initially informed individual consent was taken from all the patients included in the study. In all the children malnutrition was diagnosed based on height / length and mid arm circumference. A detailed history of present illness, relevant past history, an accurate dietetic history, through general and systemic examination was done. All the children were grouped into 4 grades of malnutrition according to Indian Academy of Paediatrics recommendation, (Ghai, 1972).

Data was collected in questionnaire. Detailed history of patient was taken on admission. Detailed history included age, socioeconomic status, address, past history, present history, dietetic history was taken. Haemoglobin, stool examination, stool examination and chest x-ray were done. General examination of patient was done. Any child with history of diarrhoea and worm infestation two weeks prior to this study was excluded.

Diagnosis of Lactose malabsorption is made clinically on the basis of development of following symptoms after oral lactose load: loose motions which are watery, frothy, explosive, accompanied by irritability, abdominal distension and flatulence; anal soreness; vomiting and stool pH less than 6.

Barium-meal examination of small intestine is done after full preparation of the patient with radio-opaque Micropaque. After 4 hours fast, 25 to 35 ml of micropaque was injected through nasogastric tube. Thirty minutes later X-ray was taken to visualize jejunum and small intestine. If it was inconclusive then it was repeated at the interval of 15 minutes.

Dilatation, flocculation, segmentation and thickening of mucosa were taken as criteria to label the case as malabsorption syndrome.

RESULTS

Intestinal enzyme activity is associated with malnutrition, because lactase enzyme being more sensitive and present at the lowest activity, falling lowest and recovers last during

the disease process. Other reason being lactose free formulae are not freely available and our population may not even afford it. The purpose of this study is to find out lactose malabsorption in patients suffering from different grades of malnutrition so focused more on main cause.

Grades of Malnutrition	Mild to Moderate Changes	Severe Changes	Normal Barium Meal	Spoiled
First Seen Cases				
I	8	1	4	2
II	12	0	3	0
III	16	4	1	3
IV	5	5	0	3
Total	41	10	8	8
Follow-Up Cases				
I	5	0	3	0
II	11	0	1	1
III	17	0	0	0
IV	11	1	0	0
Total	44	1	4	1

Table 1. Radiological Changes of Malabsorption Syndrome in Total Cases Studied

The severity of the damage as evidenced by radiological examination was categorized into mild to moderate if two changes were present and severe, if three or more of the above changes were present.

In majority of cases combined radiological changes of malabsorption syndrome were seen.

Grades of Malnutrition	Mild To Moderate Changes	Severe Changes	Normal Barium Meal	Spoiled
First Seen Cases				
I	1	0	0	1
II	10	2	1	1
III	10	6	1	2
IV	5	3	2	0
Total	26	11	4	4
Percent	57.8	24.44	8.88	8.88
Follow-Up Cases				
I	0	0	0	0
II	6	0	0	0
III	14	2	1	0
IV	7	2	0	0
Total	27	4	1	0
Percent	84.37	12.9	2.73	0

Table 2. Radiological Changes of Malabsorption Syndrome in Lactose Malabsorbers

Radiological changes of malabsorption syndrome were seen in 37 cases out of 45 of lactose malabsorbers. Out of which 26 cases (57.8 per cent) were having mild to moderate changes and 11 cases (24.44 per cent) showed severe changes. The barium meal was normal in 4 cases (8.88 per cent) of lactose malabsorbers.

In follow up group out of 32 lactose malabsorbers 27 cases (84.37 per cent) showed mild to moderate radiological evidence of malabsorption syndrome, and 4 cases (12.9 per cent) showed severe changes, total being 31 out of 32 (97.27 per cent).

The difference between figures of first seen group i.e. 82.24 per cent and follow up group i.e. 97.27 per cent was found to be significant. This indicates that there was no improvement in radiological findings after one month follow up.

Lactose Malabsorbers (30 cases)

Mild to Moderate Changes		Severe Changes		Normal Barium Meal	
No. of Cases	Percent	No. of Cases	Percent	No. of Cases	Percent
23	76.7	6	20.0	1	3.3
25	83.4	4	13.3	1	3.3

Table 3a. Radiological Changes of Malabsorption Syndrome in Lactose Malabsorbers and Absorbers (Case to Case Follow-Up)

Mild To Moderate Changes		Severe Changes		Normal Barium Meal	
No. of Cases	Percent	No. of Cases	Percent	No. of Cases	Percent
12	80.0	1	6.67	2	13.33
13	86.67	0	0.0	2	13.33

Table 3b. Lactose Absorbers (15 cases)

Lactose malabsorbers were severely malnourished in case of grade III and grade IV malnutrition compared to grade I and grade II malnutrition. This indicated lactose malabsorption increases with severity of malnutrition. Lactose malabsorption did not improve after one month of nutritional rehabilitation therefore not included malnourished absorber cases as controls.

When case to case follow up was done for radiological evidence of malabsorption syndrome in lactose malabsorber group, out of 30, 23 cases (76.7%) showed mild to moderate changes, 6 (20%) showed severe changes and one (3.3%) being normal. When followed 25 cases (83.4%) showed mild to moderate changes and 4 cases (13.3%) showed severe changes indicating that only 2 cases of severe changes improved into mild-moderate changes, which is not significant.

Similarly, in lactose absorber group out of 15 cases, 12 (80 per cent) showed mild moderate changes, one (6.67 per cent) showed severe changes, and two cases (13.33 per cent) were normal. When all these cases were followed, only one case of severe radiological changes showed improvement to mild- moderate change, which is again not significant.

DISCUSSION

Semenza et al were isolated two lactases from the human intestine and were able to show that the two beta-galactosidases in the mucosa of human jejunum and ileum are not the result of an artefact and that of cellobiase activity remains constant in relation to that of each of the lactases.⁷ Auricchio et al found lactase/cellobiase ratio to be 2.4, suggesting that there is deficiency of lactase first and that the low lactase activity is found mainly due to lactase first.⁸

Doell was able to isolate specific lactase, partially purified and antibodies have been developed against the enzyme derived from rat and human intestine.⁹

Gray and Santiago (1969), described three beta-galactosidases, a specific lactase with maximum activity at pH 6.0 located in the brush border, a beta-galactosidase with the same pH optimum, but inactive against lactose, located in the cytoplasm, and a beta-galactosidase with a pH optimum of 4.5 in the lysosomes. They postulated that non-specific beta-galactosidase in brush border is a precursor for the specific lactase.¹⁰

Laws et al found characteristic changes in radiograph taken after giving a suspension of micro opaque barium sulphate with 25 gm. of lactose in lactase deficient subjects. The small intestine appeared distended by dilute contrast medium; peristalsis was very active, the contrast medium reaching the transverse or descending colon within an hour, while the haustral pattern was strikingly prominent.¹¹

Howland stated from clinical observation we can be very sure that there is with many patients an abnormal response on the part of the intestinal tract to carbohydrates which expresses itself in the form of diarrhoea and excessive fermentation. He went on to postulate v that such patients have some deficit in the ferments necessary for the hydrolysis of lactose.

CONCLUSIONS

In this study, varying grades of malnutrition between six months to 3 years of age were included for the evidence of lactose malabsorption by detecting stool pH and by doing a barium meal radiograph for the evidence of malabsorption syndrome. There is no correlation of radiological evidence of malabsorption syndrome between lactose malabsorbers and absorbers. In majority of cases, combined radiological changes of malabsorption syndrome were seen. Radiological changes of malabsorption syndrome were seen in 37 cases out of 45 of lactose malabsorbers. When case to case follow up was done for radiological evidence of malabsorption syndrome in lactose malabsorber group, out of 30, 23 cases showed mild to moderate changes, 6 showed severe changes and one being normal. Whether malnutrition is cause or effect of lactose malabsorption, is yet to be decided.

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