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Liv.52 in malnutrition and sub-optimal growth

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INTRODUCTION

The term growth means physical increase in size of the whole or part of the body. It can be measured in terms of inches or centimetres, and pounds or kilograms. It can also be measured in terms of metabolic processes. The sum total of anabolic and catabolic processes increase or decrease growth. Nearly one-third of the life span is spent in growing. This inherent tendency to grow is very strong in children. However, it can be affected by many factors like malnutrition, various acute and chronic illnesses, endocrine disturbances and congenital anomalies.

The liver holds a position of singular importance in the system. Besides its secretory and excretory functions it effectively controls numerous metabolic processes via the 'metabolic pool'. It is actively concerned with the synthesis of plasma proteins, blood volume regulation, reticulo-endothelial activity, heat production and storage of important vitamins and minerals. It has a very important role in the metabolism of proteins, fats, carbohydrates and minerals which in turn are significant for promotion of body growth.

Any drug which can keep the liver functioning at its optimum is most important. In the research programme while screening, various drugs which could be useful in liver dysfunction, Liv.52* (Himalaya Drug Co. Private Ltd.) showed extreme promise. Since then it has been extensively used in various conditions. Its anabolic effect has been widely approved and confirmed experimentally. This anabolic, growth-promoting effect is due to increased food consumption and efficient utilisation by which it helps the process of nitrogen retention. Keeping this anabolic effect in mind, Liv.2 was used in children with malnutrition and sub-optimal growth and nutrition to study the changes.

(* A combination of indigenous drugs containing extracts of Capparis spinosa, Cichorium intybus, Solanum nigrum, Cassia occidentalis, Terminalia arjuna, Achillea millefolium, Tamarix gallica (prepared in the juices and decoctions of various hepatic stimulants).

In protein-calorie malnutrition (PCM), there is always a negative nitrogen balance. With an idea to increase, if possible, the nitrogen balance and thereby enhance the growth, this trial with Liv.52 was undertaken. In addition, Liv.52 also has a definite effect on appetite. In PCM grade III, it is noted that children invariably have anorexia of marked to moderate degree. Liv.52, in PCM, by increasing the appetite, helps in improving nutrition and also helps early gain in weight in bringing back the nitrogen balance to normal.

MATERIAL AND METHODS

Two groups of children (A) protein-calorie malnutrition, were studied. The children in group A of protein-calorie malnutrition belonged to different grades (PCM – classified according to Gomez) and were admitted to the Pediatric Department of Civil Hospital, Ahmedabad. From the group of protein-calorie malnutrition only grades II and III cases were included. Grade I was encountered in only blood and liver disorders. They were given specific as well as symptomatic treatment in addition to Liv.52, 15 drops t.i.d. Routine investigations were carried out in each patient. Liver function tests were carried out wherever possible. Liver biopsy was also performed when indicated.

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After discharge they were called for follow-up every week or fortnight to a special clinic and their records maintained. 110 cases were of protein-calorie malnutrition and 15 had either liver or blood disorders also. All the cases were followed up for a period of 3 to 12 months.

In group B, sub-optimal growth and nutrition, the children attending the MCH Centre were selected for the study. They belonged to the families from a constant population attending the MCH Centre regularly. Those children whose linear records for at least one year were available and who showed a very slow rate of growth were selected for study. The criteria for selection of children for study were evidence of sub-optimal growth and nutrition and availability of previous record of at least one year. All these children belonged to the low-middle income or very low income groups mostly belonging to Classes III and IV government employees who had a fixed income. In Class IV families the income per capita was low due to the large size of the family. After selection, the children were put on Liv.52 15 drops t.i.d. and the growth records were noted every month. Liver function tests were carried out in some cases.

OBSERVATIONS

Out of a total of 3941 annual admissions, there were 1213 cases of protein-calorie malnutrition. Of these 555 were of grade I, 474 were of grade II and 184 were of grade III, i.e. more than 50% had grades II and III malnutrition. Out of 125 cases studied in Group A, 110 were of protein-calorie malnutrition and 15 had in addition either cirrhosis, infective hepatitis or some blood disorders. There were 71 males and 54 females.

As shown in Table I, 66% of cases were of grade III protein-calorie malnutrition and 78% of children were under 3 years of age. This shows that protein-calorie malnutrition is much more common in this age group — for out of 98 children, 70 had grade III PCM. All the cases of grade I PCM were of infective hepatitis, or some blood disorder. Cases of cirrhosis of liver had grade III protein-calorie malnutrition. Fifty cases were followed up regularly. The results were graded as excellent when in two months weight gain was 4 lb., good when between 2 to 4 lb., fair when between 1 to 2 lb., and poor when below 1 lb. In two cases the maximum weight gain was 22 lb. in one and 15 lb. in another during a period of 5 to 6 months. Weight gain was evident in 46 out of 50 cases. In four cases there was very little or no weight gain. All these four cases, aged between 6 months and 2 years, were of grade III PCM and had severe anaemia and chronic diarrhoea, the duration of illness being from 3 months to one year. One of these cases gained 6 lb. in weight within a year but deteriorated due to chronic diarrhoea.

There was associated illness in all 125 cases — 60 had gastroenteritis, 24 had respiratory infections, 4 cardiovascular disease, 16 worm infestation, 15 miscellaneous illness, and 2 each tuberculosis, __teric fever and meningitis. One hundred and 7 patients had associated anaemia, 57 grade I (Hb 8.1 to 10.5 gm%), 26 grade II (Hb 5.1 to 8 gm%) and 24 grade III (Hb 5 gm%). Almost all the cases had one chronic illness leading to grade II and grade III PCM.

Liver function tests were carried out in 60 cases of which 20 cases did not show any gross deviation from normal. Total proteins were reduced in 36 children. Liver biopsy showed only vacuolation due to lack of body fat. Fifteen children with associated blood and liver disorder were followed regularly and showed considerable improvement with good weight gain and improvement in growth. The liver function tests returned to normal.

Liv.52 is confirmed to be a good appetiser and in PCM cases it is a great boon. By increasing the appetite at an early stage it brings about early recovery and reduces the hospital stay. The weight gain in all cases followed up for a period of 3 months to one year varied from 4 lb. to 16 lb. In 4

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cases who did not show any improvement there was some specific cause which did not allow weight gain. Liver function tests were normal in all cases of PCM. The serum proteins were reduced in 38 cases which returned to normal within a month.

In group B sub-optimal growth and nutrition, out of 55 cases only 43 could be followed up for 9 months to one year. There were 23 males and 20 females. Their growth was assessed by measuring their weight, height and chest circumference. Significant gain in weight was noted in the children after administering Liv.52. If there was a weight increase of 3 lb. or more it was considered good, 2 lb. fair and 1 lb. or less poor. Out of 43 cases 30 showed good response, 7 fair and 6 poor.

The change in other parameters of growth before and after Liv.52 were noted. The head circumferences did not show change in any children above 6 years of age. In many children where the head and chest circumference crossing had not occurred previously due to expansion of the chest, the change was noted in them.

Besides the growth, the appetite was uniformly increased in all the children. There was a feeling of general well-being and increased activity. The incidence of gastro-intestinal disturbances and other minor infections like upper respiratory tract infection was reduced when compared to the previous records.

The liver function tests were done at the beginning of the treatment with Liv.52 in 10 cases but none of these showed any abnormality. The repeat testing was carried out in 6 out of 10 and did not show any significant change as these were all normal children with low rate of growth.

It was noted that the intercurrent illnesses were much less after Liv.52 and there was a general feeling of well-being. These effects are mainly due to increased nitrogen balance and anabolic activity of the product.

DISCUSSION

A. Protein-calorie malnutrition (PCM)

Protein-calorie malnutrition (PCM) is a major problem in pre-school children. In the child population PCM is widely prevalent and after infancy its incidence gradually increases. One-third of the cases admitted in the hospital suffer from PCM and of these 60% have either grade II or III PCM, which means that they all have more than 25% weight loss. That PCM is more a disease of pre-school children is also shown by our study in which 80% of the cases were of age group birth — 3 years. This is the time when the child completely changes over from milk to a solid diet. In the majority of our cases breast-feeding was continued upto 18 months to 2 years and a solid diet not offered adequately and at the proper time. Secondly, infections are also very common at this stage which increase the nutritional deficiencies. The majority of children had one or more associated infections and 107 out of 125 had anaemia of varying severity. Gastro-intestinal infection is the most common one which also leads to marked PCM.

PCM is usually associated with severe anorexia and all the children included in the study had anorexia. Liv.52 is known to have a good effect on appetite. In children where it is very essential that a drug be palatable, Liv.52 was palatable to such an extent that many mothers had to keep the bottles in safe custody. The effect on appetite was evident within a week in all grade II and some of grade III PCM cases. Those cases of grade III PCM with extreme anorexia and associated with severe anaemia took a little longer. With the treatment of associated deficiencies and illnesses if anorexia does not improve then it takes 3 or 4 weeks before the symptoms of recovery begin. In 46 cases of PCM the weight gain started within 10 days of hospitalisation. Liv.52 helps recovery by

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increasing the appetite and its anabolic activity helps to establish a positive nitrogen balance and thus helps in the weight gain. Recovery of PCM is mainly judged by the weight gain. Out of 46 cases the majority had excellent to good gain in weight. It is seen that the majority of the cases were below 3 years of age. Normally the total gain in weight during the second year is only 5-6 lb, which would amount to ½ or less than that in one month. In the cases under study the weight gain was noted within 10 days and steadily increased. If we include cases with one follow-up examination (15 days after the discharge) in those cases also we found weight gain of at least one lb or more.

Along with gain in weight, there was also increase in height and head and chest circumference which showed over all increase in growth.

From our previous observations and comparing them with Liv.52 in PCM, we also noted that as the appetite improved early duration of hospital stay could be reduced which has many advantages. After discharge from the hospital on further follow-up we could note that the gain in weight was slowed down. In some cases it was found out that due to socio-economic status, the family could not supply adequate diet to the child. Later, we supplied the supplementary diet from our MCH Centre and the weight gain was resumed to previous levels.

Liv.52 is a good appetiser and is very useful in cases of PCM, provided children are supplied proper food. It is also very useful in correcting digestive disorders and in controlling some non-infective diarrhoea thereby improving the nutrition.

B. Sub-optimal growth and nutrition

The anabolic effect of Liv.52 is confirmed experimentally. Sub-optimal growth especially in children of the low income group could be due mainly to undernutrition and negative nitrogen balance. In reports from Kulkarni *et al* it is shown that Liv.52 is more effective in the negative nitrogen balance state. The anabolic effects are generally shown by increased growth pattern.

In the present study the increase in appetite was noted in all the cases. The weight gain varied from nil to as much as 7.7 lb during the study period. In 6 cases the weight gain was waxing and waning due to intercurrent illnesses like measles, respiratory infection and chronic diarrhoea. In the remaining cases the weight gain was notable as compared to the weight gain in the previous year. The increase in height varied from 5-10 cm. After the second year the normal height gain averaged about 5 cm. Except the 6 cases which did not show any improvement rest of them gained satisfactorily. The head and chest circumference also increased. The chest circumference is more important after two years of age than the head circumference as the head growth is very minimal after 2 years of age. In some cases even though Liv.52 improved the appetite children failed to show the notable changes because the diet at home was inadequate. In such cases we supplemented their diet by corn-soya milk powder which gave daily 100 calories and about 12 gm of proteins. The weight gain and subsequently the gain in other parameters improved. This shows that if the food supply is inadequate however good a drug may be, it will not be beneficial. In low income group children the food habits should be changed and then the growth would be better.

The results of this study in protein-calorie malnutrition and in cases of sub-optimal growth clearly show that Liv.52 holds an important place in their therapy. There was improvement of appetite, growth and nutrition; and weight gain was observed during the period of study and observation. There were no toxic effects of Liv.52.

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