GROWTH ASSESSMENT IN CHILDREN WITH EXTRA-HEPATIC PORTAL VEIN OBSTRUCTION AND PORTAL HYPERTENSION

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ABSTRACT – ***Background –*** Several studies carried out to examine the growth of children with extra-hepatic portal vein obstruction and portal hypertension have reported a variety of findings. ***Aim*** – To assess anthropometric indices in children with portal hypertension due to extra-hepatic portal vein obstruction and who were treated by endoscopic variceal sclerotherapy. ***Methods*** – Anthropometric data were obtained retrospectively from the medical records of 24 patients who had been followed for 3.8 ± 2.5 years at the Pediatric Gastroenterology Outpatient Clinic of the University Hospital, Campinas, SP, Brazil. The mean Z scores of weight for age, height for age and body mass index at diagnosis and at the last consultation were compared to reference data of the National Center for Health Statistics. The two recordings were compared to assess the long-term effect of the condition. ***Results*** – The mean Z scores at diagnosis and at the last follow-up visit were all within normal ranges when compared to the reference population, with the following respective values: weight for age, 0.042 ± 1.09 and 0.132 ± 1.29; height for age, 0.200 ± 1.04 and 0.466 ± 1.24, and body mass index, -0.223 ± 0.98 and -0.198 ± 0.98. In addition, there were no significant differences between the Z score values obtained in the two recordings. ***Conclusion*** – Portal hypertension due to extra-hepatic portal vein obstruction was not associated with growth impairment in the group of children studied.

HEADINGS – Growth. Hepatic vein thrombosis. Hypertension, portal. Child.

INTRODUCTION

The most important cause of extra-hepatic portal vein obstruction (EHPVO) in children is portal vein thrombosis. Causes of this condition have been reported to be associated with three groups of predisposing factors: conditions which directly injure the vessel, rare portal vein congenital anomalies, and a group of systemic causes such as neonatal sepsis, dehydration, multiple exchange transfusions, and hypercoagulable states[1, 12].

Children with portal vein obstruction are commonly asymptomatic and the first clinical manifestation usually is sudden gastrointestinal bleeding. The clinical course involves recurrent bleeding which occurs during the period of active body growth. Hepatocellular failure occurs rarely during the course of the disease and the extent to which body growth is affected varies according to different series. MOWAT[9] reported adequate growth in asymptomatic children with EHPVO, whereas those with more frequent bleeding showed severe growth retardation. MEHROTRA et al.[8] found a significantly lower height for age Z score in 22 Indian children with EHPVO when compared either to a national control or to the National Center for Health Statistics (USA) data. SARIN et al.[11] studied 61 children treated successfully with sclerotherapy, 51% of whom had stunted height (height for age <90% of controls). These authors have not evaluated directly growth velocity but found that the diagnosis and the follow-up height for age Z scores of some children were not statistically different. KATO et al.[6] studied retrospectively the effect of portosystemic shunt on the growth of 12 children with portal hypertension, 6 of whom had underlying liver disease with impairment of liver function, and found that growth parameters improved after

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surgery. Finally, ALVAREZ et al.[2] studied a group of 40 children and did not observe growth retardation prior to portal shunting. They have not mentioned Z scores for height but have reported the occurrence of an increase in growth velocity after surgery.

The objective of the present study was to assess growth parameters in a Brazilian cohort of children with portal vein thrombosis and portal hypertension.

PATIENTS AND METHODS

We reviewed the clinical files of children who were consecutively admitted to the Pediatric Gastroenterology Outpatient Clinic of the University Hospital at the State University of Campinas, SP, Brazil, from January 1991 to March 2001. The group consisted of 24 children with bleeding from esophagogastric varices and non-cirrhotic portal hypertension. The overall cause of portal thrombosis was not established, although five patients had undergone neonatal umbilical catheterization. Diagnosis was based on a history of upper gastrointestinal bleeding and/or splenomegaly and the presence of esophageal varices detected by upper digestive endoscopy[1, 2]. The condition was confirmed by abdominal ultrasonography. None of the patients had prothrombotic disorders as evaluated in a previous study[14]. None of the patients presented clinical or biochemical evidence of portal biliopathy or liver failure during follow-up. All but two patients had suffered upper gastrointestinal bleeding and needed therapeutic sclerotherapy. Sclerotherapy sessions were held every 2 weeks to eradicate or reduce the number and diameter of varices. Variceal obliteration was successful in all children and check-up endoscopies were done at 3, 6 and 12 months after the last therapeutic session, and then every year according to the check-up schedule proposed by MALUF-FILHO et al.[7].

The anthropometric data at diagnosis and at the last follow-up medical visit before this study were obtained from the files. Weight and height were recorded at every medical visit. Weight (to the nearest 0.1 kg) was measured with an electronic scale (Filizola ID 1500 model) and height (to the nearest 0.1 cm) with a stadiometer. The body mass index (BMI) was calculated by weight/height^2. Weight, height and BMI were transformed into standard deviation scores (Z score) using the NCHS reference[3, 10]. The results were expressed as means SD when appropriate.

The SPSS software version 11.0 was used to analyze the data. The Wilcoxon test was used for statistical analysis, with the level of significance set at 5%.

The Hospital Ethics Committee approved the study.

RESULTS

Patient median age at diagnosis was 5.9 years and at the last medical visit 11.2 years. Thirteen patients were males. Median age at first bleeding was 5.2 years; range: 1.1-14.1 years. Mean follow-up time was 3.8 ± 2.5 years, ranging from 7 months to 9.8 years (Figure 1).

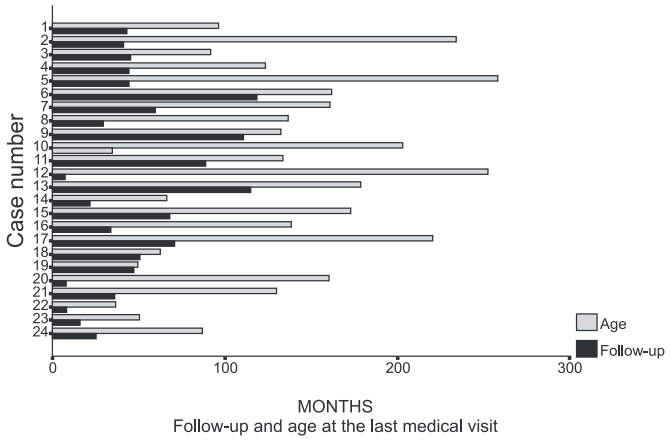

FIGURE 1 – Period of follow-up and age of 24 patients with portal vein thrombosis at the last medical visit

At the last anthropometric record, 6 patients were included in the sclerotherapy program and 16 were on the check-up schedule.

Serum albumin levels and liver biochemical and functional tests were repeated at 4-month intervals and showed no hepatocellular abnormalities in any patient.

Mean gastrointestinal bleeding was two episodes during follow-up, with a range from 1 to 4. Two patients had no bleeding and they received propranolol in order to prevent bleeding.

The mean Z scores for weight for age, height for age and BMI are shown in Table 1. According to the reference data of the National Center for Health Statistics, the weight and height values of all patients were adequate for their age at both recordings. When diagnosis and follow-up Z scores for each anthropometric index were compared in order to evaluate body growth throughout follow-up, no difference was observed between these values ($P > 0.05$, Wilcoxon test).

DISCUSSION

In childhood, chronic digestive diseases usually result in malnutrition and the main manifestation of chronic nutritional insults is body growth retardation[4]. In the present study, children with portal vein thrombosis had no growth retardation at diagnosis or during follow-up, since anthropometric indices were within normal ranges in both recordings. Changes in weight for age and height for age Z scores were not observed and the BMI indicated that the

TABLE 1 – Mean Z scores of weight for age, height for age and body mass index of 24 patients with portal vein thrombosis. Values recorded at diagnosis (initial) and at the last follow-up visit (final); mean follow-up was 3.8 ± 2.5 years

	Time of study					
	Initial			Final		
	n	Mean	SD	n	Mean	SD
WAZ	24	0.042	1.09	24	0.132	1.29
HAZ	24	0.200	1.04	24	0.466	1.24
BMI	22	-0.223	0.98	22	-0.198	0.98

WAZ = weight for age Z score
HAZ = height for age Z score
BMI = Body mass index Z score
n = Number of cases
SD = Standard deviation

nutritional status was adequate when compared to the NCHS parameters for healthy controls. The children did not developed chronic undernutrition during follow-up.

All patients included in the present series had portal vein thrombosis not associated with hepatocellular disease and none of them presented evidence of portal biliopathy. The variceal bleeding was successfully managed by endoscopic obliteration of varices, with low morbidity.

Most studies on the impact of EHPVO on growth have reported a negative effect on children's growth, but their series included different subgroups of patients. It is known that the underlying etiology and the associated conditions influence the clinical presentation of EHPVO[12], so the outcome may possibly be variable as well. All reports are based on clinical and retrospective observations, and authors have analyzed different anthropometric parameters. These methodological aspects impair comparisons, and the conclusions obtained in some series cannot be extrapolated to other populations.

SARIN et al.[11] conducted a comprehensive study that observed part of the patients longitudinally; they found very poor growth indices (height for age Z score under -2) at diagnosis and the nutritional condition did not change during 15 months of follow-up after successful sclerotherapy.

The discrepancy between the present data and other results may be related to the etiological factors associated with portal vein thrombosis, which were not fully defined in the present series. Also, epidemiological, social and economic factors differ among studies. These conditions may also have resulted in uncontrolled effects on growth parameters. Differences in food ingestion are other features that have not been considered.

Therapeutic options for children with portal hypertension include pharmacological[13], endoscopic[15, 16] and surgical interventions[5]. Propranolol has been evaluated for the treatment of EHPVO but a large trial is needed to fully ascertain the efficacy of this drug in their setting. Variceal obliteration is successfully achieved by endoscopic sclerotherapy with low morbidity, although it requires repeated hospital admissions and is not a definitive treatment. Portosystemic shunts are efficient in the treatment of EHPVO, but they are associated with surgical complications and sometimes cannot be performed due to the unavailability of an adequate vessel[2, 12]. Some authors favor surgical intervention considering that it promotes the recovery of growth parameters. Some series observed this recovery in the outcome but their patients were not undernourished before surgery[2, 6]. The role of surgery in overcoming growth retardation and preventing progressive liver damage remains to be confirmed by more studies. In the present study patients with EHPVO showed no clinical or anthropometric signs of malnutrition, despite the fact that all but two patients had presented gastrointestinal bleeding. Patients were treated by sclerotherapy under a strict clinical management to present rebleeding. Iron replacement was provided whenever necessary. Our data do not indicate the occurrence of acute or chronic undernutrition in patients with EHPVO since there were no adverse effects on height their or weight during the follow-up period. These observations suggest that general pediatric care and sclerotherapy are efficient in counteracting the deleterious effects of portal hypertension associated with portal thrombosis in nutritional and growth parameters.

Rigorous prospective anthropometric evaluation, identification of the relevant socioeconomic variables and assessment of the frequency of bleeding should be included in future studies designed to define the true effect of EHPVO on children's growth.

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RESUMO – ***Racional*** – Dados referentes às repercussões da obstrução extra-hepática da veia porta sobre o crescimento de crianças são escassos. ***Objetivo*** – Avaliar os índices antropométricos de um grupo de crianças com trombose de veia porta e hipertensão portal, acompanhadas longitudinalmente, cujos episódios de sangramento digestivo foram controlados por meio de esclerose endoscópica das varizes esofágicas. ***Métodos*** – Os dados antropométricos foram obtidos retrospectivamente a partir dos prontuários de 24 pacientes. Os escores Z das relações peso para idade, altura para idade e o índice de massa corporal foram registrados na primeira consulta no serviço e na última consulta anterior ao estudo, após seguimento de 3,8 ± 2,5 anos. As duas medidas de cada paciente foram comparadas aos dados do Centro Nacional de Estatística da Saúde dos EUA e entre si. ***Resultados*** – As médias dos valores de escore Z estavam dentro dos valores considerados normais para a população de referência, peso para idade: 0,042 ± 1,09 e 0,132 ± 1,29; altura para idade: 0,200 ± 1,04 e 0,466 ± 1,24 e índice de massa corporal: -0,223 ± 0,98 e -0,198 ± 0,98, para os registros na primeira e na última consulta, respectivamente. A comparação dos valores de escore Z de cada uma dessas relações, ao longo do tempo, não demonstrou diferença estatística. ***Conclusão*** – O presente grupo de crianças com trombose de veia porta e hipertensão portal não apresentou atraso de crescimento durante o acompanhamento clínico.

DESCRITORES – Crescimento. Trombose da veia hepática. Hipertensão portal. Criança.

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