



ORIGINAL ARTICLE

## Cholelithiasis in obese adolescents treated at an outpatient clinic<sup>☆,☆☆</sup>

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Received 30 April 2013; accepted 21 August 2013

Available online 20 December 2013

### KEYWORDS

Obesity;  
Cholelithiasis;  
Hepatic steatosis;  
Children;  
Adolescent

### Abstract

**Objective:** to describe the frequency and the factors associated with cholelithiasis in obese adolescents.

**Methods:** this was a cross-sectional descriptive study performed with the adolescents between 10 and 19 years of age treated at the Child and Adolescent Obesity Outpatient Clinic from May to December of 2011. Obesity was defined as body mass index (BMI) > P<sub>97</sub>, and overweight as BMI > P<sub>85</sub>, for age and gender, according to the 2007 World Health Organization reference. A questionnaire concerning the presence of signs and symptoms, such as abdominal pain, nausea, vomiting, and intolerance to fat, was administered. Patients were asked about how many kilograms they had lost and in how much time. Laboratory parameters were: triglycerides, total cholesterol, high density lipoprotein (HDL), low density lipoprotein (LDL), aspartate aminotransferase (AST), and alanine aminotransferase (ALT) levels. Cholelithiasis and hepatic steatosis were diagnosed by ultrasonography.

**Results:** cholelithiasis was diagnosed in 6.1% (4/66) of the obese adolescents, most of whom were female (3/4); hepatic steatosis was identified in 21.2% (14/66). Intolerance to dietary fat was reported by all patients with cholelithiasis (4/4) and by 17.7% (11/62) of the group without cholelithiasis (p = 0.001). The average weight loss was 6.0 ± 2.9 kg in the patients with

<sup>☆</sup> Please cite this article as: Nunes MM, Medeiros CC, Silva LR. Cholelithiasis in obese adolescents treated at an outpatient clinic. J Pediatr (Rio J). 2014;90:203–8.

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**PALAVRAS-CHAVE**

Obesidade;  
Litíase biliar;  
Esteatose hepática;  
Criança;  
Adolescente

cholelithiasis and  $3.2 \pm 4.8$  kg in the group without cholelithiasis ( $p=0.04$ ). However, there was no difference between the two groups regarding the time of weight loss ( $p=0.11$ ).

**Conclusions:** cholelithiasis and hepatic steatosis are frequent among obese adolescents and should be investigated systematically in the presence or absence of symptoms.

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**Litíase biliar em adolescentes obesos atendidos em ambulatório****Resumo**

**Objetivo:** descrever a frequência e os fatores associados à litíase biliar em adolescentes obesos.

**Métodos:** estudo descritivo tipo corte transversal com adolescentes entre 10 e 19 anos atendidos em ambulatório de obesidade infanto-juvenil, no período de maio a dezembro de 2011. A obesidade foi definida como índice de massa corporal  $> P_{97}$  e o sobrepeso  $> P_{85}$ , para idade e sexo, segundo o referencial OMS 2007. Foi aplicado um questionário com dados relacionados à presença de sinais e sintomas, como: dor abdominal, náusea, vômito e intolerância à gordura. Os pacientes foram questionados sobre quantos quilos perderam e em quanto tempo. As variáveis laboratoriais foram: triglicédeos, colesterol total, lipoproteína de alta densidade (HDL) e lipoproteína de baixa densidade (LDL), aspartato aminotransferase (AST) e alanina aminotransferase (ALT). A litíase biliar e a esteatose hepática foram diagnosticadas por ultrassonografia.

**Resultados:** a litíase biliar foi diagnosticada em 6,1% (4/66) dos adolescentes obesos, a maioria do sexo feminino (3/4); a esteatose hepática foi identificada em 21,2% (14/66). Intolerância à gordura da dieta foi referida por todos os portadores de litíase biliar (4/4) e por 17,7% (11/62) do grupo sem litíase biliar (0,001). A média de perda de peso foi de  $6,0 \pm 2,9$  kg nos pacientes com litíase biliar e  $3,2 \pm 4,8$  kg no grupo sem litíase biliar ( $p=0,04$ ). Porém, em relação ao tempo de perda não houve diferença entre os dois grupos ( $p=0,11$ ).

**Conclusões:** a litíase biliar e a esteatose hepática são frequentes entre adolescentes obesos e devem ser investigadas sistematicamente na presença ou ausência de sintomas.

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**Introduction**

The prevalence of obesity in children and adolescents continues to rise in many countries. In the United States, obesity has more than doubled in children and tripled in adolescents over the last 30 years.<sup>1,2</sup> In Brazil, a study of 4,914 children aged 4 to 6 years conducted in the public schools of Rio Grande do Sul and Santa Catarina found a prevalence of obesity of 14.4% and 7.5%, respectively.<sup>3</sup> In Bahia, a study that included 1,056 children aged 0 to 5 years found a 15.2% prevalence of overweight/obesity.<sup>4</sup>

Several studies have described the deleterious effects of obesity, such as metabolic syndrome, cardiovascular disease, joint disease, polycystic ovary syndrome, fatty liver, gallstones, as well as social and psychological problems.<sup>5-7</sup> Cholelithiasis is a recognized comorbidity in obese adults,<sup>8</sup> although little studied in pediatric patients.<sup>9,10</sup> Another epidemiological finding is the higher frequency of cholecystectomy in this age group that has been observed in recent years.<sup>11</sup>

Infants, children and adolescents with cholelithiasis appear to comprise three different populations regarding pathogenesis and predisposing factors.<sup>10</sup> In the prepubertal cases, black pigment calculi predominate, which are associated with hemolysis, parenteral nutrition, cirrhosis, and heart valve replacement.<sup>12</sup> Cholesterol calculi are the most frequent during and after adolescence,<sup>12</sup> when changes in

estrogen metabolism may result in increased bile lithogenicity and formation of this type of gallstones.<sup>13</sup>

Particular attention must be given to obese, dyslipidemic adolescents, pregnant women, and oral contraceptive users, as these individuals are more likely to develop gallstones, in addition to the high percentage of idiopathic cases.<sup>10,14</sup> Overweight adolescents are twice as likely to have gallstones when compared to adolescents with normal body mass index (BMI).<sup>14</sup> For the obese, the chance increases by four-fold, and for those with severe obesity, the likelihood of having this condition is six-fold higher.<sup>14</sup>

Clinically silent cholelithiasis is increasingly diagnosed as an incidental finding during imaging examinations, particularly abdominal ultrasound. In adults, 50% to 70% of cases are asymptomatic,<sup>15</sup> and progression to symptomatic disease is relatively low, ranging from 10% to 25%.<sup>15</sup> Conversely, most children and adolescents present symptoms, from unspecific abdominal pain symptoms to biliary symptoms, such as biliary colic and jaundice.<sup>9,10,13</sup>

The upper transabdominal ultrasound examination is the diagnostic method of choice, with a sensitivity and specificity greater than 95%, and the capacity to show calculus size and location. The image is characterized by hyperrefringence and presence of acoustic shadow. The exam begins with the patient in the supine position and the patient can be moved to the left posterior oblique or upright position to demonstrate stone mobility.<sup>16</sup> Schweizer et al.<sup>13</sup> recommend

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