

**Assessment of The Therapeutic Effect of
Calcium and Vitamin D on Vitamin D Level
and Bone mineral Density in children with
Chronic Liver Disease**

Thesis

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pediatrics

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SUMMARY AND CONCLUSION

Chronic liver diseases are the continuity of clinical or biochemical evidence of hepatic Dysfunction for longer than six months.

Metabolic Bone disease is a major complication in patients with chronic liver disease; Osteoprosis accounts for the majority of cases whereas Osteomalacia is rare in the absence of sever advanced liver disease.

Vitamin D deficiency in chronic liver disease is strongly correlated with bone density changes, most guidelines recommend calcium and vitamin D supplementation in patients with chronic liver disease and low bone density

This study was carried out to evaluate the therapeutic effect of Calcium and Vitamin D on bone mineral density in children and adolescents with chronic liver disease and low bone mineral density in the Hepatology Clinic Children's Hospital– Ain Shams University

The study included the following:

- **Patients:** 18 patients of children and adolescents following up at the Pediatric Hepatology Clinic Children's Hospital - Ain Shams University in the period from April 2008 to June 2009 they comprised 13 females and 5 males,

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INTRODUCTION

Chronic liver disease is defined as cirrhosis (clinically suspected or histologically proved) or the presence of severe cholestatic liver disease (serum bilirubin level more than three times the upper limit of normal for more than six months).
(Collier et al.; 2002)

Metabolic bone disease is common among patients with chronic liver disease. Osteoporosis accounts for the majority of cases whereas Osteomalacia is rare in the absence of severe advanced liver disease. *(Rouillard and Lane; 2001)*

Metabolic bone disease occurring in individuals with chronic liver disease, known as hepatic osteodystrophy, is a potential complication of long standing hepatic disease.
(American Gastrological Association; 2003)

Osteoporosis and osteoporotic fractures occur commonly in patients with chronic liver disease, the prevalence of Osteoporosis and osteoporotic fractures has been reported to vary between 37-53% and 4-21% respectively.

The pathogenetic mechanism of hepatic Osteodystrophy is complex and may be due to defective osteoplastic bone formation, increased osteoclastic bone resorption, or both.
(Maalouf et al.; 2006)

Introduction

Osteoporosis is a histologic diagnosis; however, clinical recognition relies on non invasive imaging studies such as bone mineral density measurements and radiography, which enable an assessment of bone mass and fracture risk. The World Health Organization defines osteoporosis as bone mineral density 2.5 standard deviations below the young normal mean by (T score). *(Rouillard and Lane; 2001)*

Vitamin D deficiency in chronic liver disease is strongly correlated with bone density changes. Most guidelines recommend calcium and vitamin D supplementation in patients with chronic liver disease and low bone density. *(Bronwyn et al.; 2006)*

Calcium , an essential component of bone mineral, given in 1000 -1500 mg daily in divided doses(two to three times daily) has a role in treatment as it suppresses parathyroid hormone thus lowering bone resorption, Vitamin D in a dose of 400 -800 IU Daily increasing fractional intestinal calcium absorption. *(Maalouf et al.; 2006)*

Aim Of the work

The aim of this study was to evaluate the therapeutic effect of Calcium and Vitamin D on the level of vitamin D and bone mineral density in children and adolescents with chronic liver disease.

Chapter1

Chronic Liver Disease in Children

Chronic Hepatitis

Chronic hepatitis is defined as ongoing inflammation within the liver that is capable of progression to cirrhosis, liver failure, and death. Also is defined as the presence of continued hepatic inflammation, as confirmed by clinical manifestations and laboratory studies, for a period of greater than 10 weeks (*Suchy, 1996*).

Two major categories of chronic hepatitis are recognized- chronic persistent (CPH) and chronic active hepatitis (CAH)- based on multiple factors which are hepatocellular necrosis, apoptosis and inflammation and the location of the inflammatory lesion found in histological specimens (*Sherlock, 1997*).

▪ **Causes of chronic liver disease (*suchy, 2001*).**

➤ **Metabolic Disorders**

• **Carbohydrate metabolism**

- Glycogen storage disease
- Fructosemia
- Galactosemia

- **Lipid metabolism**
 - Gaucher's disease
 - Niemann–Pick disease, type D
 - Wolman's disease
- **Protein metabolism**
 - Tyrosinemia
 - Cystinosis
- **Mineral metabolism**
 - Hemochromatosis
 - Wilson's disease
 - Infantile copper overload
- **Biliary Malformations**
 - Primary sclerosing cholangitis
 - Biliary atresia
 - Primary biliary cirrhosis
 - Arteriohepatic dysplasia
 - (Alagille syndrome)
 - Intrahepatic biliary hypoplasia
 - Choledochal cyst
 - Congenital hepatic fibrosis
 - Intrahepatic cystic biliary
 - (Caroli's disease)
 - Familial intrahepatic cholestasis (Byler's disease)

- **Infectious diseases**

- **Viral**

- Chronic hepatitis B+/- delta
 - Chronic hepatitis C
 - Cytomegalovirus agents
 - Herpes simplex virus
 - Rubella

- **Bacterial**

- Syphilis
 - TB

- **Parasitic**

- Shistosomiasis
 - Liver flukes.

- **Genetic disorder**

- α 1-antitrypsin deficiency
 - Cystic fibrosis

- **Vascular**

- Vascular lesions
 - Budd–Chiari syndrome
 - Congestive heart failure
 - Congestive pericarditis
 - Veno-occlusive liver disease
 - Venacaval web (*suchy, 2001*).