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Introduction

In children, chronic liver diseases are mainly caused by cholestasis like biliary atresia or Alagille syndrome. Chronic cholestasis can have a variety of adverse effects on bone metabolism leading to an increase bone fragility and risk of osteoporotic fractures. Osteoporosis is a common condition characterised by low bone mineral density and an increased risk of fractures and it is often treated with bisphosphonates (BPs). Therefore, a treatment of BPs could be beneficial in children suffering from chronic cholestasis and bone fragility. To date, no specific recommendation exists and few data related to this issue are available.

Objective: To evaluate the effect of bisphosphonates in paediatrics patients with a chronic cholestasis and osteoporotic fractures.

Methods

Children were included to this retrospective study if they had:

- a chronic liver disease
- osteoporotic fracture(s)
- a treatment with BPs

Clinical, biological, radiological data and type of treatment were collected from charts of patients in the paediatrics hepatology department of the Bicêtre hospital

Results

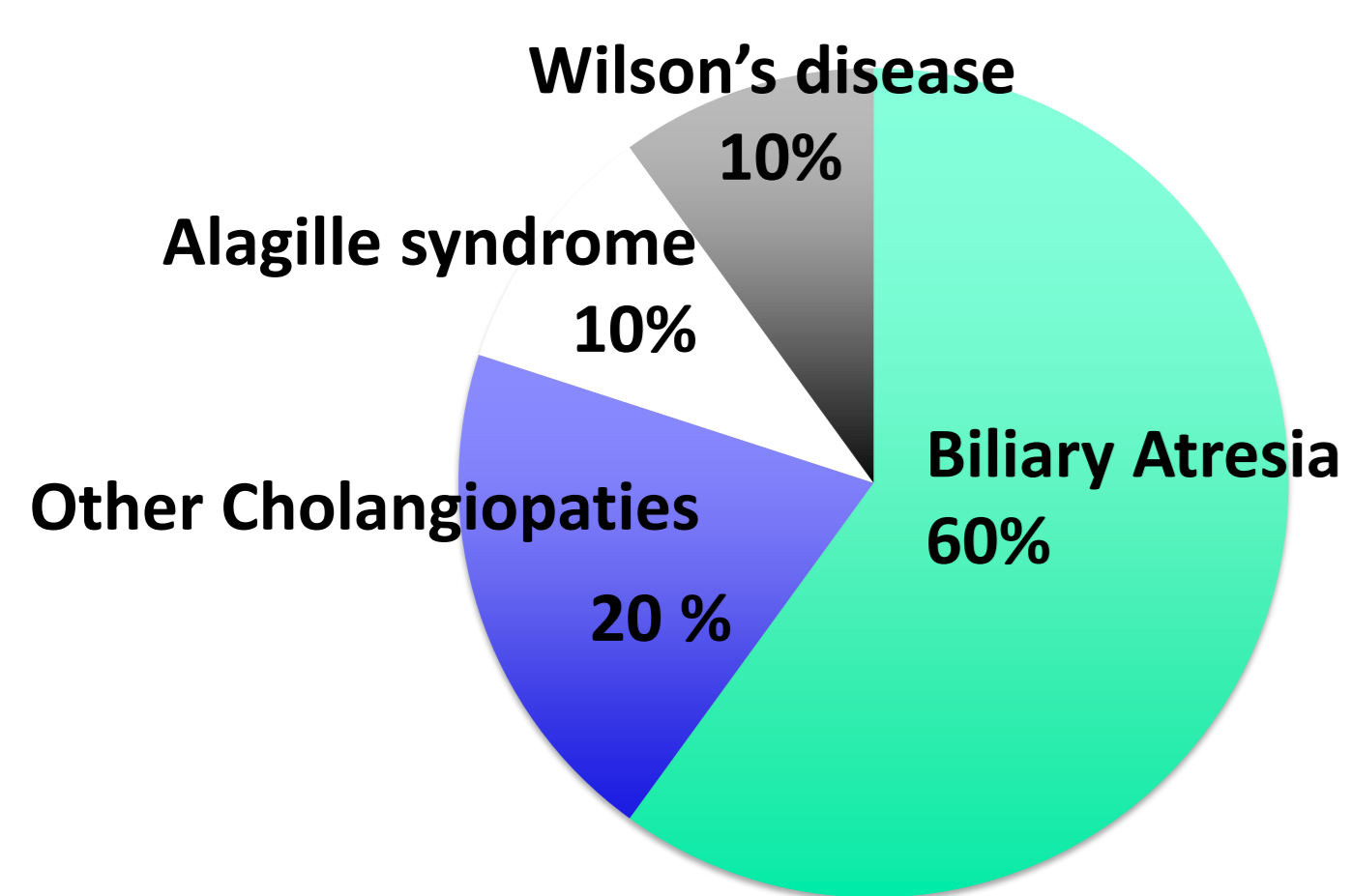


Figure 1. Distribution of 10 children with chronic liver disease.

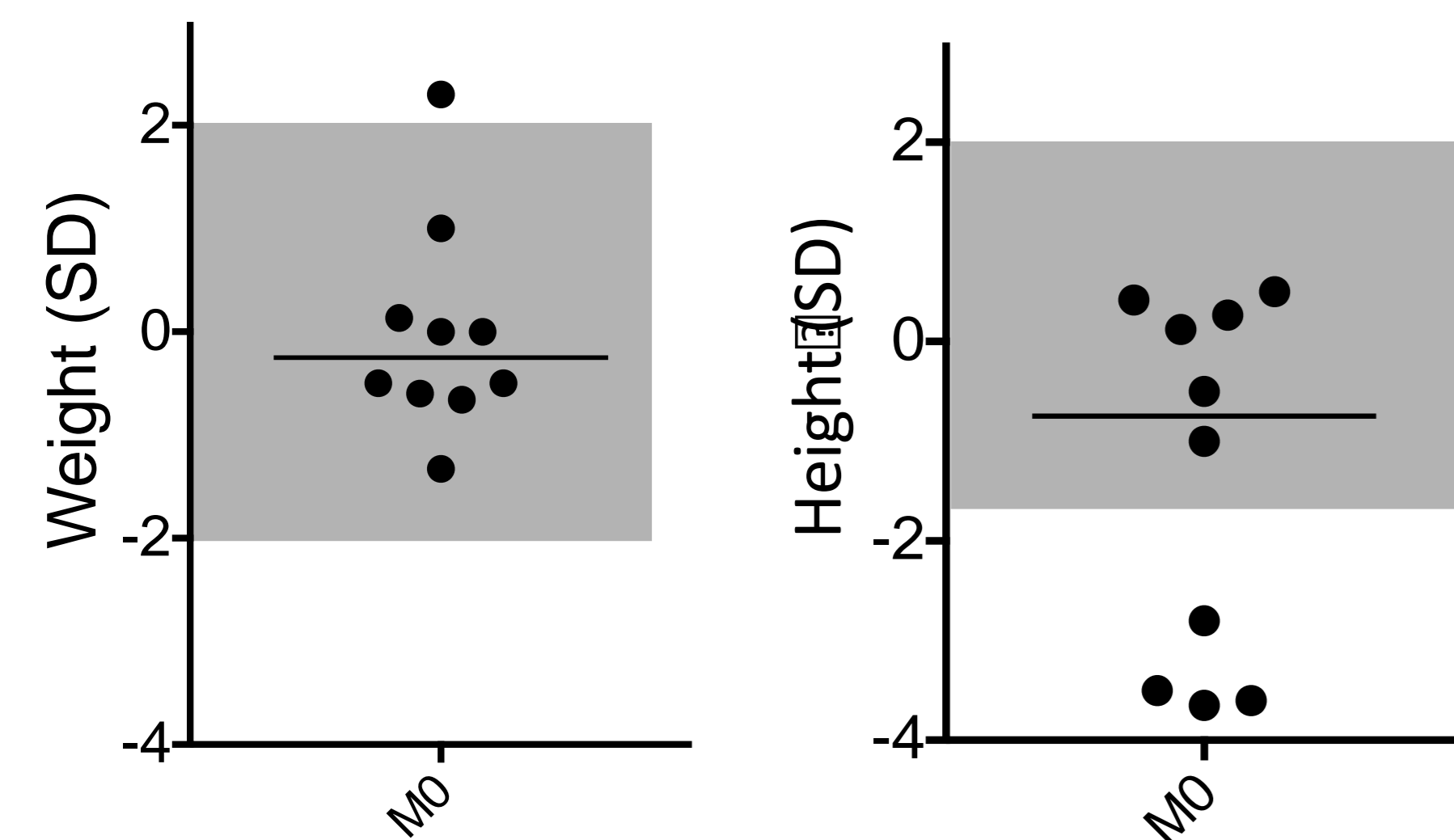


Figure 3. Anthropometric data at the beginning of BPs treatment (M0).

Nutrition	Enteral		Total
	+	-	
Parenteral	+	5	5
	-	3	5
Total	8	2	10

Figure 4. Nutritional support at the beginning of BPs treatment (M0).

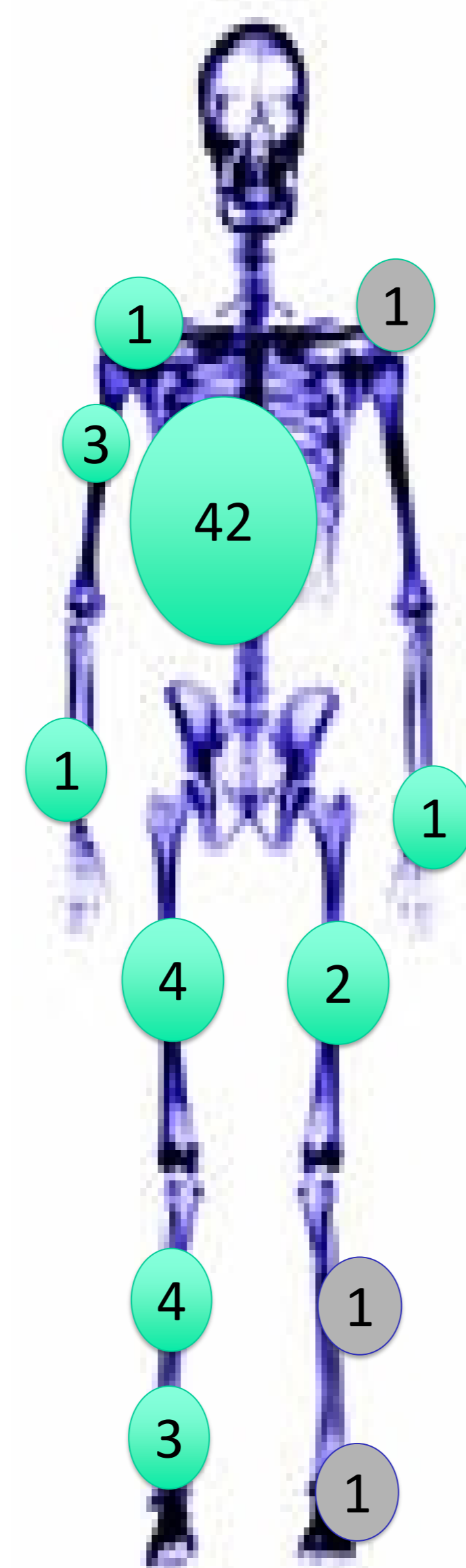


Figure 5. Distribution of 64 fractures. 66% of the fractures were localized at the spine. In grey 3 fractures observed after M0.

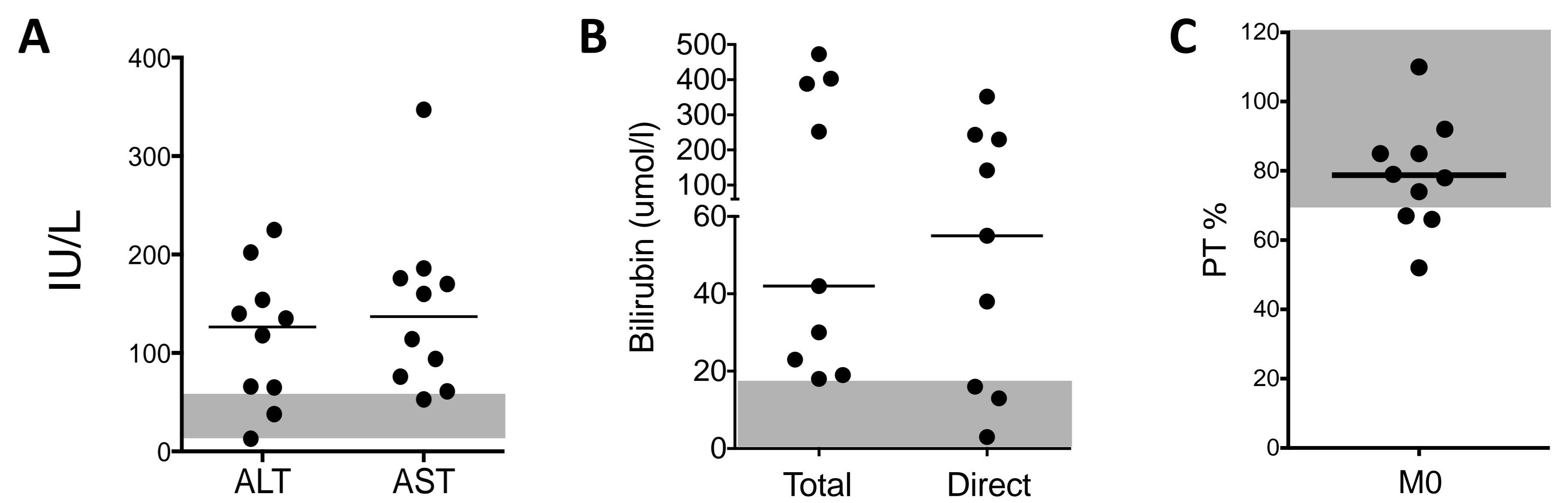


Figure 2. Results of liver function tests at beginning of BPs treatment (M0). **A.** Most of the included patients presented with hepatic cytolysis (AST and ALT > 50 IU/L). **B.** Most of patients have an icteric cholestasis (Total and Direct bilirubin > 17 µmol/l). **C.** Three patients had a prothrombin time (PT) lower than normal range. Grey zones of the graphs represent reference values for each test.

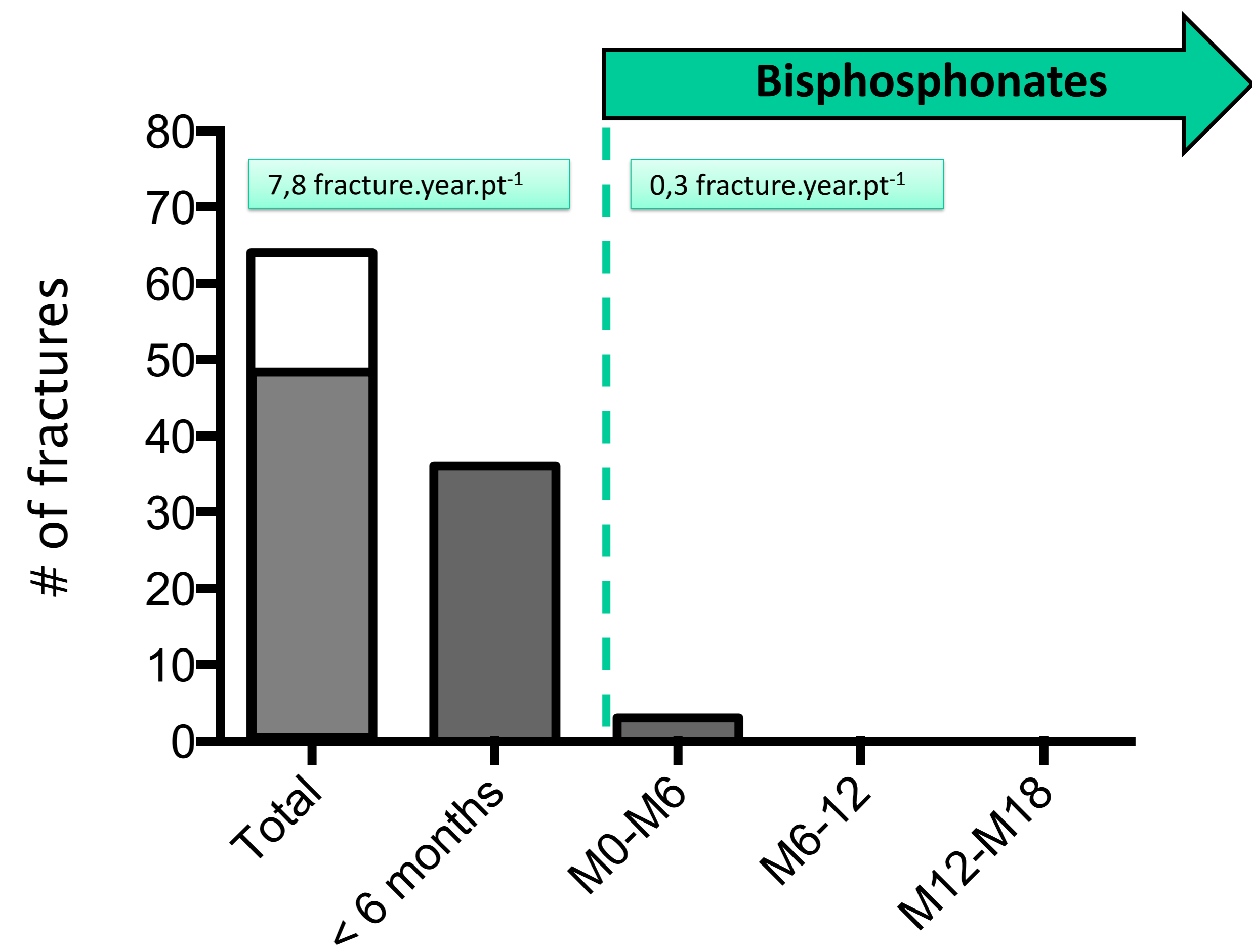


Figure 6. Evolution of the number of fractures in ten children before and after BPs treatment. A total of 64 fractures were identified: 15 were diagnosed only through systematic X-rays. 39 fractures occurred 6 months before BPs treatment (M0). Only 2 patients had 3 fractures after the beginning of BPs. The duration of follow-up was of 12.8 months and the BPs cumulated dose was 2.8 mg/kg. Only 2 patients presented a flu-like syndrome at the first injection. 4 children had a liver transplant after 6 months of BPs.

Conclusion

Our results suggest that bisphosphonates could be a treatment for children with chronic cholestasis and osteoporotic fractures. Our systematic radiological review showed asymptomatic fractures, suggesting that bone fragility is underestimated in these patients.