Comprehensive Therapy of Biliary Dyskinesia in Children with Cerebral Palsy: Clinical Effectiveness of Ursodeoxycholic Acid

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Abstract. Background: Cerebral palsy (CP) is a major cause of chronic disability in children, frequently accompanied by gastrointestinal dysfunction. Biliary dyskinesia (BD) occurs in up to 50% of CP patients, aggravating nutritional deficiency and reducing quality of life. Ursodeoxycholic acid (UDCA) has established hepatoprotective and choleretic properties, but its role in pediatric CP remains insufficiently studied.
Key words: children, cerebral palsy, biliary dyskinesia, ursodeoxycholic acid (UDCA), nutritional deficiency**.**
Objective: To evaluate the clinical and laboratory effectiveness of UDCA combined with diet therapy and physiotherapy in children with CP and BD.
Patients and Methods: A prospective 6-month clinical study included 40 children aged 6–14 years with CP and BD. The main group (n=20) received UDCA (10–15 mg/kg/day), dietary correction, and physiotherapy (magnetotherapy, massage, therapeutic exercise). The control group (n=20) received standard symptomatic therapy. Biochemical (ALT, AST, bilirubin, alkaline phosphatase), coprological, and clinical parameters were assessed. Statistical analysis employed Student's t-test and χ^2 test, with significance set at $p<0.05$.
Introduction. Cerebral palsy (CP) is one of the most prevalent causes of chronic disability in children, associated with multisystem involvement. Gastrointestinal dysfunction, particularly biliary dyskinesia (BD), affects 30–50% of CP patients, leading to bile stasis, dyspeptic symptoms, steatorrhea, and worsening nutritional deficiency. Ursodeoxycholic acid (UDCA) has demonstrated hepatoprotective, choleretic, and membrane-stabilizing effects in cholestatic liver disease. However, evidence on its efficacy in pediatric CP with BD remains limited. This study addresses this gap by evaluating UDCA as part of a comprehensive therapeutic approach.

Materials and Methods

Study Design: Prospective, controlled clinical study.
Participants: 40 children aged 6–14 years (mean 9.2±2.1 years) with CP and BD.
Groups:
-Main group (n=20): UDCA (10–15 mg/kg/day), dietary correction (restriction of animal fats, inclusion of mild choleretic foods), physiotherapy (magnetotherapy, massage, therapeutic exercise).
-Control group (n=20): standard symptomatic therapy without UDCA.
Physiotherapy Protocols:

-Therapeutic exercise (3 sessions/week, 30–40 min).
-Segmental abdominal and lumbar massage (15 procedures, repeated every 2 months).
-Magnetotherapy and electrophoresis with magnesium sulfate (two courses during observation).
Parental Involvement: Educational sessions, dietary consultations, observation diaries, psychological support. Compliance was 85% in the main group vs. 60% in controls.
Outcome Measures: Biochemical tests (ALT, AST, bilirubin, alkaline phosphatase), coprological analysis, clinical symptom monitoring.
Statistical Analysis: Student's t-test and χ^2 test, significance threshold $p<0.05$.

Results

Parameter	Main group (baseline)	Main group (6 months)	Control group (6months)
Bilirubin (µmol/L)	24.6±5.2	16.8±4.1*	22.9±5.0
ALT(U/L)	46.2±8.5	28.4±6.2*	41.7±7.9
AST(U/L)	42.5±7.1	27.9±5.8*	39.8±6.7
ALP(U/P)	310±45	240±38*	295±41

Biochemical Outcomes: Significant reduction in bilirubin, ALT, AST, and alkaline phosphatase in the main group compared to baseline and control ($p<0.05$).

Clinical Outcomes:

Clinical outcome	Main group (%)	Control group (%)
Abdominal pain reduction	75%	40%
Stool normalization	65%	35%
Dyspeptic symptom reduction	80%	45%

Abdominal Pain Reduction. At baseline, recurrent abdominal pain was one of the most frequent complaints among children with CP and biliary dyskinesia. After six months of comprehensive therapy including UDCA, dietary correction, and physiotherapy, 75% of patients in the main group reported a marked decrease in pain intensity and frequency. Parents noted fewer nocturnal episodes and less discomfort after meals. In contrast, only 40% of children in the control group experienced similar improvement, highlighting the superior efficacy of the combined therapeutic approach.

Normalization of Stool Patterns. Disorders of stool consistency and frequency—such as alternating constipation and diarrhea—were common in both groups at the start of the study. In the main group, 65% of children achieved regular, well-formed stools without episodes of diarrhea or constipation by the end of the observation period. Parents also reported improved appetite and reduced anxiety associated with defecation. In the control group, normalization was achieved in only 35% of patients, underscoring the added value of UDCA and supportive therapies.

Reduction of Dyspeptic Symptoms. Symptoms such as nausea, bitter taste in the mouth, and poor appetite were prevalent before treatment. Following comprehensive therapy, 80% of children in the main group demonstrated significant improvement, with many parents recording complete resolution of these complaints. Children showed better eating behavior, increased willingness to consume meals, and fewer episodes of food refusal. In the control group, improvement was observed in 45% of patients, indicating limited effectiveness of standard symptomatic management alone.

Discussion. The study demonstrates that UDCA, when combined with diet therapy and physiotherapy, significantly improves biochemical, coprological, and clinical outcomes in children with CP and BD. These findings are consistent with international data on UDCA's hepatoprotective and choleretic effects. The involvement of parents enhanced compliance and contributed to sustained therapeutic outcomes. Limitations include relatively small sample size and short follow-up duration. Future research should focus on larger cohorts, longer observation periods, and quality-of-life assessments.

Conclusion. Comprehensive therapy with UDCA, dietary correction, and physiotherapy is effective in managing BD in children with CP. This approach improves liver function, digestion, and clinical symptoms, and may serve as an optimal model of care. Further multicenter studies are recommended to validate long-term efficacy and safety.

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