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Research Article

Modern Clinical and Laboratory Features of the Current of Conjugative Jaundice in Donbass

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Abstract

Objective: To elucidate the patterns of development of conjugated jaundice, including prolonged jaundice, the relationship between clinical and laboratory parameters in children with conjugated jaundice, and to evaluate the effectiveness of treatment regimens.

Materials and Methods: The medical records of 69 patients with conjugated jaundice admitted to the clinic in 2023-2024 were analyzed. The interactions of pregnancy pathology, prematurity, mode of delivery, perinatal CNS damage, thymomegaly, concomitant infections, anemia, bilirubin levels and dynamics, ALAT and ASAT, and age at hospitalization were taken into account. Statistical data were processed using Student's t-test for relative values and variation series and the Fisher's angular transform method.

Results: In 82.6% of infants, jaundice developed against an unfavorable background: pregnancy pathology, maternal illnesses, cesarean section, prematurity, anemia, infections (omphalitis, dacryocystitis, rhinitis, intestinal dysbiosis). Premature infants were significantly more likely to have bilirubin above 200 μmol/L and a positive ALAT/ASAT ratio, more often thymomegaly and infections, and significantly less often ASAT above 50 U/L. Children with thymomegaly are more likely to have unfavorable factors in their medical history, and infections are significantly less common. Thymomegaly was significantly less common in infants under 15 days of age than in those over 46 days of age. Children with perinatal CNS pathology were significantly more likely to have high ALFT levels and more often high ASAT and bilirubin levels. The use of the angioprotector pentoxifylline, which improves microcirculation, in the complex treatment of conjugated jaundice promotes its faster resolution.

Conclusion: 1. Perinatal CNS pathology is accompanied by high levels of ALAT, ASAT, and bilirubin. 2. Thymomegaly is a protective barrier against infections in infants that occurs under unfavorable conditions (pregnancy pathology, maternal illness, etc.). Its development requires a certain amount of time. 3. The use of the angioprotector pentoxifylline in the complex treatment of conjugated jaundice promotes its faster resolution.

Keywords: *Conjugated Jaundice; Thymomegaly; Pentoxifylline*

Introduction

Neonatal jaundice is a significant cause for concern for parents and pediatricians. The most common type of jaundice encountered by pediatricians in outpatient settings is prolonged neonatal conjugation jaundice, the etiology of which remains unclear [7]. Conjugation jaundice is considered physiological as long as its onset, peak bilirubin level, and disappearance time are within physiological limits.

Conjugation jaundice lasting more than two weeks in full-term infants and more than three weeks in premature infants is considered prolonged. This situation prompts consultation with a physician and often hospitalization.

Conjugation jaundice is diagnosed in children who have a disorder of bilirubin conjugation in the liver without an explanation, which is manifested by unconjugated hyperbilirubinemia in the absence of anemia and reticulocytosis.

The development of conjugated hyperbilirubinemia is associated with factors such as maternal infection, pregnancy-related illnesses, various chronic extragenital pathologies (diabetes mellitus, cardiovascular disease, gastrointestinal disease, kidney disease, and anemia), labor stimulation and induction, and prematurity, which can lead to hypoxia and delayed maturation of the liver glucuronyl transferase system [1,2,5,7].

Phototherapy, phenobarbital, ursodeoxycholic acid, antihypoxants, vascular, and other medications are traditionally used in the treatment of conjugated jaundice [3- 5,7].

Aim of the Study

The aim of the work to clarify the patterns of development of conjugation jaundice, including prolonged jaundice, the relationship between various clinical and laboratory parameters in children with conjugation jaundice, as well as to evaluate the effectiveness of various treatment regimens.

Materials and Methods

The study included medical records of patients who were diagnosed with conjugated jaundice as a primary or concomitant condition upon discharge from the neonatology department. A total of 69 such patients were diagnosed over a 12-month period. The data for children treated for less than four days were not included in the study.

All patients underwent a comprehensive examination. We included bilirubin levels upon admission and discharge, ALT and AST, hemoglobin and red blood cell levels, and thymus echolocation data.

Statistical data processing was performed using the Student's t-test for relative values and variation series and the Fisher's angular transform.

Results and Discussion

Children's ages at hospitalization ranged from 8 to 76 days, with the peak age at 1 month. Hospitalization duration ranged from 2 to 27 days, with an average of 12.5 days. The parameters of children treated for less than 4 days were not included in the evaluation of treatment effectiveness.

Bilirubin levels on admission ranged from 70 to 378 μmol/L, with an average of 95.2 μmol/L; ASAT levels ranged from 21 to 126 U/L, with an average of 54 U/L; and ALAT levels ranged from 3.4 to 102, with an average of 31.2 U/L.

Since the majority of children (56, 81.2%) were breastfed, the influence of the composition of breast milk on the activity of liver glucuronyl transferase (Arias and Lucey-Driscol syndrome) cannot be ruled out [5,7]. This is only a hypothesis, since in real life, the diagnostic refusal of breastfeeding for 2-3 days is not popular with either doctors or lactating women [4].

During the analysis, we took into account the interaction of such factors as pregnancy pathology (46 children), prematurity (15), cesarean section (14), perinatal CNS damage (PCNSD, 46), thymus enlargement (TE) (33), concomitant infections (16), anemia (27), bilirubin level (more/less than 200 μmol/l - 37/30), ALAT (more/less than 30 U/l - 25/40), ASAT (more/less than 50 U/l - 28/37),

positive ALAT/ASAT ratio (6), age at hospitalization (up to 15 days - 9, 45-76 days - 10), percentage of bilirubin decrease before discharge. Not all histories contained a complete set of parameters, so the % was calculated based on the actual number.

Table 1 presents factors that differ significantly between full-term and preterm infants.

	n	Bilirubin >200 µm/l		ASAT >50 U/l		ALAT>ASAT		TE		Infections	
		n	%	n	%	n	%	n	%	n	%
Preterm infants	15	10	66,7 ± 12,60	2	15,4 ± 10,42	3	23,1 ± 12,16	33	60,0	6	40,0
Full-term infants	48	17	36,9 ± 7,42 p<0.05	24	52,2 ± 7,37 p<0.01	2	4,4 ± 3,01 p<0.05	36	42,0	10	20,8

Table 1: *Comparative indicators of preterm infants and full-term infants.*

As can be seen from the table, premature infants were significantly more likely to have bilirubin above 200 µmol/L and a positive ALAT/ASAT ratio; TE and infections were more common, but not significantly so; and AST above 50 U/L was significantly less common.

Table 2 shows factors that differed significantly between infants with and without TE.

	n	Bilirubin >200 µm/l		Pregnancy pathology		Anemia		Cesarean section		Preterm infants		Infections	
		n	%	n	%	n	%	n	%	n	%	n	%
TE+	33	17	53,1	24	72,7	15	48,4	9	29,0	9	32,1	4	12,1 ± 5,68
TE-	36	13	38,2	22	61,1	12	34,3	5	14,7	6	17,7	12	33,3 ± 7,86 p<0.05

Table 2: *Comparative data of children with and without TE.*

As this table shows, children with TE are more likely to have a history of adverse factors (pregnancy pathology, cesarean section, prematurity, high bilirubin, anemia). At the same time, infections are significantly less common in children with TE.

TE is also observed in all children with abnormal presentation and is absent in children without a history of adverse events.

These data suggest that TE provides protection against infections in infants, which occurs under unfavorable conditions (pregnancy pathology, maternal illness, cesarean section, prematurity, anemia, etc.).

Lists factors that vary significantly among infants depending on their age at admission.

	n	Bilirubin >200 µmol/l		Anemia		TE		Infections	
		n	%	n	%	n	%	n	%
Up to 15 days	10	10	100	0	0	4	33,3 ± 14,21	7	70,0 ± 15,08
45-76 days	9	1	12,6 ± 12,5 p<0.001	6	75,0 ± 16,37 p<0.001	8	88,9 ± 11,10 p<0.01	1	11,2 ± 11,10 p<0.001

Table 3: *Comparative data of children depending on age at admission.*

TE was significantly less common in younger infants (up to 15 days) than in older infants (46-76 days), indicating that TE requires some time to develop. A comparison of these two groups also revealed that younger infants were significantly more likely to have bilirubin levels over 200 μmol/L and infections. Anemia was observed in older infants and was absent in infants in the first two weeks of life.

When comparing two groups of children with and without PCNSD, it was revealed that with PCNSD, high ALAT levels were significantly more common (44.2 ± 7.57% versus 22.7 ± 9.14%, $p < 0.05$); high ASAT levels (46.5% versus 36.4%), bilirubin (47.8%/38.1%) and prematurity (26.6%/16.7%) were more common.

Various medications and their combinations were used for therapy in children, most commonly including cytoflavin (C), a combination drug that improves brain metabolism; ursofalk (U), a hepatoprotector and choleretic agent; glycine, a metabolic agent; glutargin, a compound of arginine and glutamic acid with multidirectional effects; elkar, a metabolic agent and antioxidant; and pentoxifylline (P), an angioprotector that improves microcirculation. Phototherapy was used in all cases.

In this regard, the treatment regimens were combined into two large groups: those receiving cytoflavin and pentoxifylline ± other drugs, and those receiving C ± other drugs but without P, 16 and 23 patients, respectively. In the C + P group, the average percentage of bilirubin reduction was 88.3 ± 1.53, while in the other group it was significantly lower - 77.1 ± 3.62, $p < 0.01$.

Furthermore, among the 16 patients receiving P, a reduction in bilirubin by more than 90% was observed in 56.3 ± 12.81%, while out of 30 patients who did not receive P, this occurred in only 5 (16.7 ± 6.80%, $p < 0.01$). Finally, in the three groups of patients receiving treatment with C, P, and U, the reduction in bilirubin levels in μmol/L was calculated (Table 4).

Drug	Number of children	Initial level bilirubin (μmol/L)	Final level bilirubin (μmol/L)
C	38	222,8 ± 12,49	38,9 ± 6,16*, p<0,05
U	26	216,9 ± 16,92	49,9 ± 8,22*, p<0,02
P	16	214,4 ± 17,13	23,6 ± 3,36

Table 4: *The effectiveness of individual drugs from various combinations.*

*Note: * - Significant difference from those receiving P.*

In all groups, bilirubin levels upon admission were essentially the same, and the reduction in bilirubin levels was significant ($p<0.001$). However, the final result demonstrated that in children receiving pentoxifylline as part of the combination therapy, bilirubin levels at discharge were significantly lower than with other medications.

Conclusion

1. Perinatal CNS pathology is accompanied by high levels of ALAT, ASAT, and bilirubin.
2. Premature infants with conjugated jaundice, along with higher bilirubin levels, more often have low ASAT levels and a positive ALAT/ASAT ratio.
3. Thymus enlargement is more common in children with adverse medical histories (pregnancy pathology, maternal illness, prematurity, cesarean section, anemia). Conditions such as omphalitis, dacryocystitis, rhinitis, and intestinal dysbiosis are significantly less common among children with thymus enlargement. TM protects infants from infections.
4. The use of angioprotectors that improve microcirculation, in particular pentoxifylline, in the complex treatment of conjugated jaundice, including prolonged jaundice, promotes a more rapid resolution of jaundice, which is probably associated with the relief of post-hypoxic liver ischemia syndrome.

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