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Research Article

Prolongation of Jaundice in Infants at the University Clinical Center of Kosovo During 2020

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Abstract

Objective: The aim of this paper is to gain updated knowledge about jaundice in latents and the paper will mainly focus on: frequency, etiology, predisposing factors, pathophysiology, genetics, signs and symptoms, systemic manifestations, forms of jaundice, diagnosis, treatment and extension of jaundice in latents. The objective of this paper is to investigate the cases of jaundice in neonates, in the Department of Neonatology, near the University Clinical Center of Kosovo.

Methods: The research is retrospective and was carried out in the Department of Neonatology, near the University Clinical Center of Kosovo. The subjects of the study were newborns with jaundice. The literature search was carried out through the PubMed and Google Scholar platforms.

Results: The study was conducted at the Clinic of Neonatology, near the University Clinical Center of Kosovo. In this study, data were obtained for patients hospitalized during 2020 with prolonged jaundice. A total of 842 newborns were hospitalized, of which 123 had jaundice. According to the 12-month study during 2020, it is found that 120 have fully recovered, while 3 of them have died. The gender structure shows that men participate in 72 cases (58.53%), while women in 51 cases (41.46%).

Conclusion: Timely diagnosis and adequate treatment of complications has made this important health problem in our country well treated and our results are similar to those of other centers cited in contemporary literature on this topic.

Keywords

Neonatal jaundice; Rhand ABO in compatibility; Hyperbilirubinemia; Jaundice

Introduction

Neonatal jaundice is the yellowing of the skin and the whites of the eyes in a newborn baby due to high levels of bilirubin. Other symptoms may include excessive sleepiness or refusal to eat. Complications may include seizures, cerebral palsy, or kernicterus [1]. About 60% of newborn babies and 80% of premature babies may have jaundice [1]. In most cases there is no specific underlying (physiological) disorder. In other cases it results from destruction of red blood cells, liver disease, infection, hypothyroidism or metabolic (pathological) disorders. A bilirubin level of more than 34 μmol/l (2 mg/dL) may be evident. Concerns in healthy infants occur when levels are greater than 308 μmol/L (18 mg/dL). The main features of pathological hyperbilirubinemia are: jaundice appears in the first hours after birth (icterus praecox), progresses quickly, is more intense than physiological (icterus gravis) and lasts a long time (icterus prolongatus). In those with worrisome findings, further investigation is recommended to determine the underlying cause [2]. Globally, over 100,000 premature and late-term infants die each year as a result of jaundice [3].

Epidemiology

Many factors influence the epidemiology of jaundice, although their clinical significance is often controversial. According to some studies done, the highest levels of bilirubin in the blood are found in infants in East Asia, in some Hispanic babies of Mexican origin. However, black infants in America and Great Britain have lower bilirubin levels than white infants [4]. The nature of

familial inheritance of jaundice in Chinese and Danish infants has also been confirmed. If a sibling had high blood bilirubin concentration values, the risk for subsequent children increased up to 12.5 times [4]. In the developed world, the most common causes of jaundice are Rh incompatibility, ABO incompatibility, infections, sepsis, etc. [4].

Genetics

Several epidemiological studies support the assertion that genetic contributors are important moderators in the occurrence of neonatal jaundice. These include: disorders of heme bilirubin production, bilirubin metabolism, and damage to genes that regulate red blood cell lifespan [5].

Pathogenesis

Bilirubin is the end product of heme catabolism, which mainly comes after the breakdown of hemoglobin by erythrocytes. Under normal circumstances, bilirubin undergoes conjugation within the liver, making it water soluble. It is then excreted through the bile into the GI tract, then eliminated through the feces. About 10% of urobilinogen is returned to the bloodstream and excreted through the kidneys. As a consequence of the disorder of this pathway, the level of bilirubin in the blood increases, and jaundice appears [6]. Hyperbilirubinemia is classified as: Unconjugated Hyperbilirubinemia (indirect) or Conjugated Hyperbilirubinemia (direct) [6]. Unconjugated hyperbilirubinenia is the most frequent form in the newborn period, which is manifested by jaundice [7].

Clinical manifestations

The main symptom is yellowing of the skin and whites of the eyes in a newborn baby. It is first noticed on the face, especially on the nose, while it then spreads to other parts of the body. Other symptoms may include excessive sleepiness or refusal to eat [8]. The level of bilirubin more than 34 μmol / l (2 mg / dL) can be evident, while jaundice is observed when the concentration of bilirubin in the serum is 85.5-119.7 μmol / l [8].

Complications

Unconjugated hyperbilirubinemia (severe jaundice) may result in bilirubin encephalopathy (kernicterus). Prompt and accurate treatment of neonatal jaundice helps reduce the risk of newborns developing kernicterus. Prevention of hyperbilirubinemic encephalopathy is done by early feeding with breast milk and prevention of premature births [9]. Infants with kernicterus may have lethargy, loud crying, hypertonia or hypotonia, fever, neurological disorders and even death [9].

Causes of the disease

In newborns, jaundice develops as a result of an increase in the concentration of bilirubin in the blood. Hyperbilirubinemia is the main cause of jaundice. Internal bleeding, blood infections (sepsis), Rh and ABO incompatibility, liver dysfunction, blockage of the baby's bile ducts, enzyme deficiencies, and red blood cell abnormalities that cause them to break down quickly can also cause jaundice. Prolonged neonatal jaundice is serious and should be managed as soon as possible [10]. Hyperbilirubinemia can be Unconjugated and Conjugate [11].

Diagnosis

Diagnosis is made by doing hematological and biochemical analyses. In those born after 35 weeks, transcutaneous bilirubinometer can also be used more than one day. It is also recommended to use the icterometer, a device that measures the degree of yellowness in the skin [12]. The gold standard for assessing bilirubin in the blood is the Van den Bergh reaction, which is a chemical reaction used to determine conjugated bilirubin values. The principle of this reaction is the reaction of bilirubin with diazotized sulfonyl acid and purple colored bilirubin is produced. This reaction is done to determine the type of jaundice. The patient's serum is mixed with diazo reagent, if the red color appears immediately, then conjugated bilirubin is present, this type of test is called direct positive, in the indirect positive test, the patient's serum is first treated with alcohol and later mixed with diazo reagent, if the color appears red we are dealing with unconjugated bilirubin, if conjugated and unconjugated bilirubin are present then the reaction is biphasic [13].

Treatment

Bilirubin levels vary with the age and health status of the newborn. However, any newborn with a total serum bilirubin value greater than 359 μmol/l (21 mg/dL) should receive phototherapy [14]. Babies with neonatal jaundice can be treated with colored light called phototherapy, which works by changing trans- bilirubin to the water-soluble isomer cis-bilirubin. Phototherapy is not ultraviolet light therapy, but rather a specific frequency of blue light. The light can be applied with air lamps, which means the baby's eyes must be covered, or with a device called a biliblanket, which sits under the baby's clothing close to his skin. The use of phototherapy was first discovered at Rochford Hospital in Essex, England, when a nurse, Nurse Jean Ward, noticed that babies exposed to sunlight had reduced jaundice, and a pathologist Dr. Perryman, who noticed that a drop of blood left in the sun turned green. Dr. Cremer, Richards, and Dobbs combined these observations, leading to a randomized clinical trial that was published in Pediatrics in 1968 and took another ten years to run. There is currently no reliable evidence as to whether phototherapy applied at home or in hospital is more effective for jaundiced infants [15].

Materials and Methods

The study is retrospective and was conducted at the Neonatology Clinic of the University Clinical Center of Kosovo. It summarizes a period of 12 months (from 06.01.2020 to 13.12.2020). Patients were divided according to the diagnosis of admission to the Clinic. The results were collected based on notes processed with the SPSS statistical package. The presentation of

the data is done through tables and graphs, while the analysis of the notes is done with special statistical methods.

Results

The study was conducted at the Clinic of Neonatology, near the University Clinical Center of Kosovo. In this study, data were obtained for patients hospitalized during the 12-month period (from 06.01.2020 to 13.12.2020) with prolonged jaundice. A total of 842 newborns were hospitalized, of which 123 had jaundice (Figure 1).

Out of a total of 123 hospitalized patients with prolonged jaundice in the Neonatology clinic, 120 have recovered and 3 of these have died as a result of other accompanying diseases (Figure 2).

In this study out of a total of 123 hospitalized with jaundice, 37 newborns were of normal weight, ranging from 2500g-4000g and 84 of these newborns were underweight 2480g-750g. The highest weight in newborn male children with jaundice was 4700 grams, while the lowest weight was 780 grams. The highest weight in newborn female children with jaundice was 4000 grams, while the lowest weight was 750 grams (Figure 3).

From a total of 123 hospitalized at the Clinic of Neonatology at the University Clinical Center of Kosovo during the 12-month period of 2020, where during the study it was found that the bilirubin values in newborn children were from 150 µmol / l (8 mg / dL) after the first 24 hours up to 420 µmol / l (25 mg / dL) (Figure 4).

Those diseases that caused jaundice in hospitalized patients during 2020 were also studied and classified as follows:

- 47 cases of bacterial infections and premature birth (Klebsiella pneumonia, Staphylococcus auerus and Staphylococcus epidermidis);
- 14 cases from Rh incompatibility and 2 cases from ABO incompatibility;
- 23 cases of RDS (Respiratory Distress Syndrome) and associated with infection; 12 cases from SIRS (Systemic Inflammatory Response Syndrome);
- 10 cases with internal bleeding;
- 17 other cases with liver malfunction, blocked bile duct and enzyme deficiency.

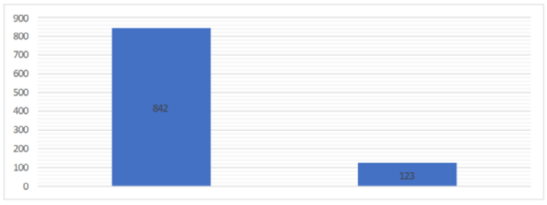

Figure 1: Latents hospitalized at the Neonatology Clinic during the12-month period in 2020.

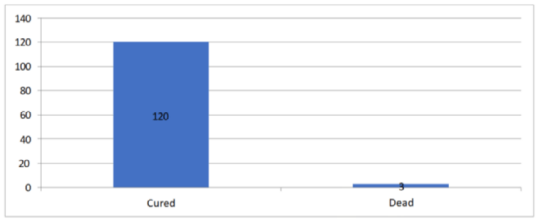

Figure 2: Latents hospitalized at the Neonatology Clinic during the12-month period in 2020.

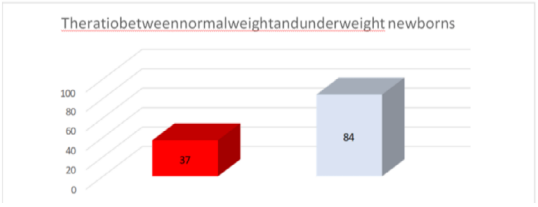

Figure 3: Normal-weight and underweight infants in the Neonatology Clinic during the 12-month period of 2020.

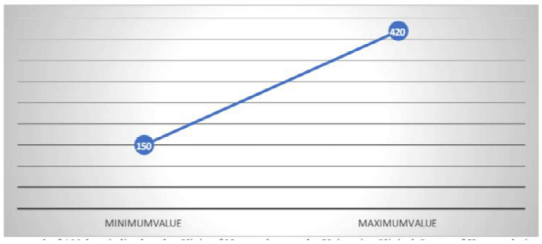

Figure 4: The minimum and maximum bilirubin levels in a total of 123 infants hospitalized in the Neonatology Clinic during the 12-month period in 2020

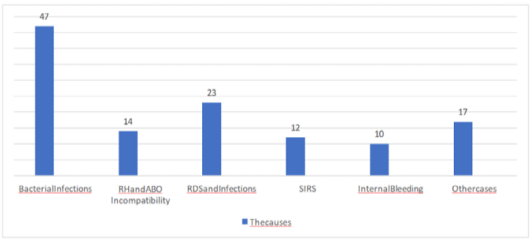

Figure 5: Diseases that caused jaundice in neonates in the Neonatology Clinic during the 12-month period of 2020.

Another research was also done on the way of feeding in babies with jaundice. Nutrition of hospitalized patients is done in two ways: 1. Breast milk nutrition, 2. Nutrition with industrial (artificial) milk formulas.

Breastfeeding started as soon as possible, as it is considered healthier than formula feeding. Children are fed 8–12 times a

day, for the reason that it helps the newborn to have as many bowel movements as possible and to remove bilirubin. In some cases when the concentration of bilirubin showed values higher than 300 μmol/L, the medicine was stopped and the children continued to be fed with industrial milk formulas, at the same time phototherapy was used, for a duration of 48–72 hours. Whereas, when the levels of bilirubin concentration have decreased, artificial feeding has been discontinued and natural feeding has been continued. Also, in some cases, surgical intervention was necessary. The reasons for surgical interventions were the opening of closed bile ducts, pyloric stenosis, intestinal obstruction as well as other diseases that were associated with jaundice (Figure 5).

Discussion

Jaundice is the yellow coloring of the skin and sclera in newborns and results from the accumulation of unconjugated bilirubin. In most infants, unconjugated hyperbilirubinemia reflects a normal transient phenomenon. However, in some infants, serum bilirubin levels may be excessively elevated, which may cause concern because unconjugated bilirubin is neurotoxic and can cause death in newborns and lifelong neurological sequelae in surviving infants (kernicterus). For these reasons, the presence of neonatal jaundice often results in diagnostic evaluation. During the research, a comparison was also made with other countries in the world, which, based on statistics, turned out to be weaker in Kosovo than in other countries. In 2006 to 2007 authors C. Henny-Harry and H. Trotman described the epidemiology of neonatal jaundice at the University Hospital of the West Indies (UHWI). During the study, a retrospective review was performed of all neonates at UHWI with clinically significant jaundice between January 1, 2006 and June 30, 2007. Demographic, clinical, and laboratory data were collected. Descriptive analyzes were performed [16]. According to this study, the incidence of neonatal jaundice in UHWI was 4.6% during the study period. There were 103 male (61%) and 67 (39%) female infants. The etiology of infant jaundice was attributed to ABO incompatibility in 59 (35%), infection in 30 (18%), prematurity in 19 (11%), G6PD deficiency in 8 (5%), Rhesus incompatibility in 6 (3.5%) and no cause was identified in 16 (9%) infants. There was a low incidence (26%) of screening for G6PD deficiency, although it was the most common etiology for infants presenting from home. Nine (5%) neonates required blood transfusion. Infants admitted from home had a significantly higher mean total bilirubin value at presentation, a significantly higher mean peak bilirubin level and presented significantly later than those admitted from the ward after delivery ($p < 0.001$). One patient was discharged with a diagnosis of bilirubin encephalopathy but lost to follow-up. Two newborns died but from causes unrelated to neonatal jaundice. Sixty-two patients (37%) were followed up after discharge; 50% had hearing tests done, all tests were normal. Sixty-one (98%) infants had normal development at the time of the study [16].

Conclusion

- In the 12-month period of 2020, 123 babies with prolonged jaundice were treated in the Neonatology department. Where 120 of them have fully recovered, while 3 of them have died.
- The gender structure shows that men participate in 72 cases (or 58.53%), while women in 51 cases (or 41.46%).
- The greatest weight in newborn male children with jaundice was 4700 grams, while the smallest weight was 780 grams.
- The greatest weight in newborn female children with jaundice was 4000 grams, while the smallest weight was 750 grams.
- The structure of causes causing jaundice lists bacterial infections and premature birth as the main cause with 47 cases (38.2%), RDS together with infections with 23 cases (18.6%), Rh and ABO incompatibility with 14 cases (11.38 %), SIRS with 12 cases (9.7%), followed by internal bleeding with 10 cases (8.13%) and 17 cases (13.8%) from different causes.
- The feeding process was done with breast milk and the children were fed 8-12 times a day, and the children were also fed with industrial milk formulas.
- The treatment of hospitalized patients depends on the levels of bilirubin concentration, the age and condition of the newborn.
- Children with total serum bilirubin higher than 350 μmol/L were treated with phototherapy, while in other cases blood exchange transfusion was used.
- The children were hospitalized for an average of 15 days.

The treatment of neonatal jaundice in our research shows that natural nutrition dominates over artificial nutrition, phototherapy treatment was also used in cases with bilirubin concentration higher than 350 μmol/L. In some cases, surgical intervention was necessary. The reasons for surgical interventions have been the opening of closed bile ducts, pyloric stenosis, intestinal obstruction as well as other diseases that have been associated with jaundice. The most common complication was chronic bilirubin encephalopathy (kernicterus). Timely and accurate treatment has reduced the risk of newborns developing kernicterus. Also, as a conclusion, 3 babies have died from prolonged neonatal jaundice accompanied by other systemic diseases.

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