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Ambulatory management of uncomplicated Jaundice for full-term neonates: An example of action- research in Rabat, Morocco

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Abstract

Aim of study: Evaluate the outpatient management of uncomplicated neonatal icterus in its therapeutic and economic aspects. **Methodology:** Prospective cohort study over 3 years. Were recruited all eutrophic newborns, born in the maternity CHIS and having an uncomplicated and not extended jaundice that requires at least one session phototherapy. Anamnestic, biological, therapeutic and economic parameters were then analyzed. **Results:** A total of 900 newborn jaundice received outpatient therapy during the study period. The average postnatal age was 4.7 ± 2.2. 43.3% or 391 newborns were completed. The mean birth weight was 3320.3 ± 578.8. 55.2% of patients were born at term. The mode of delivery was instrumentalized in 39.8% of cases. We noted a history of infectious positivity in 30.3% of cases. The median number of hours of phototherapy was 10 hours. The rate of indirect bilirubin admission was 177mg/L, the control rate after phototherapy was 101 mg/L. Concomitant mean hemoglobin in jaundiced episode was 16.33 ± 1.74. Parturients and newborns were mostly blood group O + with 38.3% and 38.8% of cases respectively. The direct Coombs test was positive in 20.4% of cases. Median CRP newborn on admission was 13 mg/L with a range of 5 and 21 mg/L. An amount of € 15,000 was saved by the center. **Conclusion:** Ambulatory management of neonatal uncomplicated icterus of eutrophic and fullterm neonates would seem to give encouraging therapeutic and economic results.

Keywords: Management, Ambulatory, Jaundice, Uncomplicated.

INTRODUCTION

Neonatal jaundice is a common and usually benign condition but having an evolutionary character. It is therefore important to detect it and take charge early. The main treatment is phototherapy. Appeared in the 1960s, it has dramatically limit the use of exchange transfusion and rarer cases of kernicterus, the most serious complication [1].

Phototherapy remains an effective therapeutic intervention that reduces bilirubin concentrations and therefore prevents bilirubin encephalopathy responsible for permanent sequelae. A study committee of the American Academy of Pediatrics (AAP) published in 2004 recommendations for the management of jaundice in infants born beyond 35 weeks of gestation [2]. These recommendations emphasize screening, can target newborn at higher risk of pathologic jaundice and seek to harmonize the professional guidelines.

Thus, in May 2013, the National Reference Centre in Neonatology and Nutrition in Morocco set up a new outpatient phototherapy protocol. The latter is based on the recommendations of the AAP while adapting to our context. This new vision aims to limit hospital condensation, reduce the prevalence of occurrence of intra- hospital neonatal infections and promote health economics concept.

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We then asked about the changes brought by the new protocol on the management of infants with a simple jaundice performing a before-after study on the management of newborns who presented a simple jaundice since 1 May 2013 until now.

METHODOLOGY

Phototherapy protocol

Protocol before May 2013

The protocol consisted of a flowchart giving broad guidelines. This was associated with serum bilirubin curves in relation to birth weight of the newborn.

The starting point was the clinical screening. Before, a measure was taken with the transcutaneous bilirubin meter (BTC).

The terms of phototherapy were determined based on the degree of elevation of serum bilirubin from the curve. Hospitalization was automatically triggered accordingly.

Protocol since May 2013

It indicates the broad lines of conduct in the management of outpatient jaundice for all newborns with uncomplicated icterus and without any associated morbidity.

When the values given by the BTC amounted, we confirm hyperbilirubinemia by a blood test.

A new bilirubin assay is realised approximately 12 hours after the start of treatment, then once per 24 hours.

On the occasion of the first dosing bilirubin, will also be performed the etiologic checkup:

- Blood group , rhesus
- Direct Coombs test
- Blood count (CBC) with reticulocytes
- C-reactive protein (CRP)

Stopping the therapy will depend on the type of jaundice. It is necessary to perform control of bilirubin 24 hours after stopping treatment.

Patients

This was a prospective study conducted from June 1, 2013 to December 1, 2015 at the Souissi maternity of Rabat (CHIS).

Only non prolonged neonatal jaundice and without identified risk factors were considered.

Inclusion criteria

All newborns at term and eutrophic born at the maternity CHIS, with uncomplicated and not prolonged jaundice that requires at least one session of phototherapy.

Breastfeeding is encouraged and adapted depending on the duration of the act.

All patients included as well, have a grouping card and a health card that records:

- A summary of their jaundiced pathology
- Clinical and laboratory data
- Programmed monitoring scheme.

At each consultation, the patient is first reassessed by the pediatrician. At the end of the newborn program, the neonates are reviewed in consultation after 48 hours, 7 days and 10 days for clinical evaluation.

Phototherapy costs and hospital staying were calculated by consulting the data administration and those attributed to actions, materials and medicines in our establishment.

Exclusion criteria

Excluded were infants with a complicated jaundice, and / or with serious birth defects that can be life-threatening, those who are premature and / or directly admitted to neonatal intensive care and those living far from the hospital and / or whose parents are not willing to outpatient treatment.

Statistical Analysis

Analysis of the results was performed using SPSS version 13.0 software. Quantitative variables were expressed as mean and standard deviation and categorical variables were expressed as number and percentage. Quantitative variables were compared using Student's t test and qualitative variables the Chi 2 or Fisher exact test. The level of statistical significance was accepted for $p < 0.05$.

RESULTS

A total of 900 newborn jaundice received outpatient therapy during the study period. The average postnatal age evaluates to 4.1 ± 2.2 days. 43.3% or 391 are term newborns. The mode of delivery was instrumentalized in 39.8 % of cases. Positive infectious history was noted in 30.3 % of cases. The median number of hours of phototherapy was 10 hours.

Table 1: Clinical descriptive data

Data		Value	
Age (days)[1]		4,1	± 2,2
Gestational age (WA)[3]			
	37-41	391	(43,2)
	<37	365	(40,3)
	>41	59	(6,5)
	ND	15	(1,7%)
Birth weight (grammes)[1]		3320,3	± 578,8
Trophicity[3]			
	Hypotrophic	309	(34,1)
	Eutrophic	500	(55,2)
	Macrosomic	96	(10,6)
Mode of delivery[3]			
	Instrumentalized	360	(39,8)
	Non Instrumentalized	545	(60,2)
Infectious history [3]			
	Positive	274	(30,3)
	Negative	631	(69,7)
Number of units of phototherapy (hours)[2]		10	[6-12]

[1] Expressed as mean ± standard deviation
[2] Expressed as median [quartile]
[3] Expressed as Number (%)

The rate of indirect bilirubin admission was 177 mg/L, after the therapy control rate was 101 mg/L.

The mean of hemoglobin rate concomitant with jaundiced episode was 16.33 ± 1.74.

Mothers and newborns were mostly blood group O + with 38.3% and 38.8 % respectively.

The direct Coombs test was positive in 20.4 % of cases.

Median CRP newborn is assessed at admission to 13 mg/L with extremes of 5 and 21 mg/L.

Table 2: Biological data

Data	value	
Indirect bilirubin (1)[2]	177	[150-201]
Indirect bilirubin (2)[2]	101	[90-123]
Hemoglobin[1]	16,33	± 1,74
Blood group for mother[3]		
O+	347	(38,3)
O-	43	(4,8)
AB+	13	(1,4)
A+	63	(7,0)
A-	95	(10,5)
B+	208	(23,0)
B-	136	(15,0)
Blood group for the neonate[3]		
O+	351	(38,8)
O-	43	(4,8)
AB+	22	(2,4)
A+	94	(10,3)
A-	62	(6,9)
B+	204	(22,5)
B-	129	(14,3)
Direct coombs Direct[3]		
Positive	185	(20,4)
Negative	720	(79,6)
CRP for the neonate mg/l[2]	13	[5-21]

[1] Expressed as mean ± standard deviation
[2] Expressed as median [quartile]
[3] Expressed as Number (%)

The average number of hospital days per patient is spared an average of 2.59 +/- 0.78 days. Knowing roughly the cost of a hospital day, which is about 60 dollars, we can make an estimate of that amount for the patients in our study. There was a difference of about 2 days of average hospitalization with theoretical full hospitalization, the amount saved for these 900 patients would be 18,000 dollars.

DISCUSSION

Since the implementation of the management method of phototherapy, much confusion has sprouted on approaches to prefer to support hyperbilirubinemia in full-term newborns. This confusion is transmitted to the care of premature infants, who were often treated as full-term newborns.

An international survey recently released shows a huge variability in care of hyperbilirubinemia and use of phototherapy in neonatal units worldwide [1].

For ten years, most neonatal centers in Canada and the USA have reduced the length of hospital stay in term infants with a simple jaundice. The Canadian Paediatric Society reiterates the importance of allowing this kind of treatment only if it can ensure good health and a suitable monitoring could be achieved [3,4]. We must inform parents about nutrition, signs of dehydration. Tests to assess concentrations of bilirubin should be readily available in outpatient settings for newborns.

The AAP also issued recommendations in 2004 whose objective was to reduce the incidence of severe and hyperbilirubinemias while minimizing adverse consequences as maternal anxiety, decreased breastfeeding, costs and unnecessary treatments [2,4].

The Canadian Paediatric Surveillance Program was state between 2002 and 2004 of 258 cases of full-term infants who required exchange transfusion or having suffered severe hyperbilirubinemia. The incidence of bilirubin encephalopathy was estimated to be 1 case per 10 000 births an incidence similar to that of phenylketonuria [5-7].

In this context, the CPS published recommendations in 2007 for the detection, management and prevention of hyperbilirubinemia in newborns at term and late preterm (35 weeks or more gestation) [8,9].

Nevertheless, all study guidelines recommend evaluating risk factors for neonatal jaundice in all children during their stay in suites of layers in order to improve the prognostic value of the “measurement of jaundice" and prevent the occurrence of severe hyperbilirubinemia after output hospital.

AAP lists the main risk factors for severe hyperbilirubinemia, namely: [2,4,10].

- Gestational age less than 38SA
- Jaundice occurring before 24 hours of life
- Exclusive breastfeeding
- Incompatibility fetal-maternal erythrocyte
- Hemolytic diseases, jaundice history of treaties in siblings
- The presence of cephalhematoma / hematoma
- The male sex.

The ideal in our context, would be to achieve a prospective, randomized, multicenter study to obtain two comparable groups (hopitalised vs non hospitalised).

Thereafter, it’s important to achieve a psychosocial study for parents after this experience.

A medical examination of the child would be expected to include distance to evaluate its neurosensorial development. It would be interesting to carry out this visit blinded the place of the child's hospitalization.

It would be finally necessary to make an economic study with assessment of hospitalization cost and economic consequences nationwide.

Meanwhile, it would be possible to extend this therapeutic practice at first to hospitals of level 2 and 3 to limit the risk of nosocomial infection, strengthen links mother and child, promote breastfeeding, reduce medical density and ensure lower cost of care.

CONCLUSION

The outpatient management of simple jaundice in full-term newborns seems to be a proper alternative medically and economically. A large study is needed on the national level to support its results including a long term follow up. The generalization of this experience to the country's peripheral hospitals should ensure proper care for uncomplicated neonatal jaundice and reduce a considerably treatment gaps and complications of this scourge.

Conflicts of interest

The authors declare that no conflict of interest exists in this research.

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