



Research Article

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A new strategy of management for newborns in a neonatal care unit: A succesful experience from Morocco

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Abstract

Aim of the study: To evaluate if the readmission rates of newborns treated in our unit has been affected by the introduction of new protocols. **Materials and Methods:** two groups were compared: Group A: newborns readmitted during the period from January 2010 to May 2011, Group B: newborns readmitted during the period from June 2011 until December 2012. Epidemiological data and settings of rehospitalization were collected on a standardized form, the reasons for rehospitalization, and evolution. **Results:** 105 were readmitted during the first four months of life , the rate of readmission was 1.8%. The difference is not significant between the two periods. The main reasons for readmission are nosocomial infection in 77% and 65% of premature groups A and B respectively, feeding difficulties with dehydration and weight loss, and viral infections in 31% and 21% of premature groups A and B respectively. The death rate was reduced in premature infants in group B (5.8%) compared to preterms of group A (23%). **Conclusion:** In our study the introduction of a new protocol support has a considerable gain in the number of patients treated, and the mortality reduction without affecting the rates of rehospitalisation.

Keywords: Rehospitalization, Neonatology, Weight, Prematurity, Death.

INTRODUCTION

Rehospitalization risk newborns during their first year of life has to be seen every neonatology output decision and especially since they are premature or low birth weight. The objective of the study is to evaluate if the rate of rehospitalization newborn supported in our service has been affected by the introduction of new management protocols.

Most studies evaluate the fate and risk of readmission of children born before 33 weeks gestation and / or PN <1500 g ^[1,2]. The preterm infants of GA <33 weeks and / or WB <1500 g have a higher risk of decompensation and respiratory infections than those born after 33 weeks.

Our study is descriptive, retrospective on a 3 year period between 1st January 2010 to 31 December 2012 and involved two groups of newborns readmitted a few days to a few months after they leave the neonatal unit of Ibn Sina's hospital, Rabat, Morocco.

The main objective of the study was to assess the rate of re-hospitalization of infants in care in our service has been affected by the introduction of new treatment protocols.

MATERIALS AND METHODS

Details of the protocols established in June 2011:

Since June 2011 the care of newborns in our department has undergone significant changes articulating goshawks on the following:

- the initiation of a reverse early enteral nutritional support the involvement of mothers in the care and the service opened to mothers 24/24H with promotion of breastfeeding,

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- the establishment of an important work for decreasing oral disorders
- the decision to early exit and flexibility in output decisions according to family circumstances
- the establishment of assiduous outpatient care after discharge, with the possibility of re-hospitalization.

To realise the objectives of our study newborns readmitted was divided into two groups: A and B; Group A: with newborns readmitted during the period from January 2010 to May 2011; Group B: with newborns readmitted during the period from June 2011 until December 2012.

Epidemiological data and rehospitalization parameters were collected on a standardized form: Maternal age, mode and place of delivery, birth weight, gestational age, pattern and duration of first hospitalization, prematurity, low birth weight, perinatal infection, respiratory distress, concept of stay in intensive care unit and mechanical ventilation, duration of first hospitalization, the output weights, corrected age and food self-sufficiency before the release, the period between the output and readmission, and the readmission reason: dehydration, feeding difficulties, respiratory distress, metabolic disorders, fever, hypothermia, anemia, transfusion, nosocomial infection, viral infection, length of hospital readmission and evolution.

Statistical Methods

The statistical analysis was established using the SPSS 17.0 software. Qualitative variables (gestational age, place of birth, admission weight, prematurity, low birth weight, neonatal infection, stay in ICU, autonomy food, rehospitalization and evolution patterns) were expressed as numbers and percentages. Quantitative variables (output weight, corrected age, weight readmission, readmission duration) were expressed as mean and standard deviation, the other quantitative variables (age at admission, length of stay first hospitalization, time between output and rehospitalization, age readmission) were expressed as median and interquartile range. The comparison between the groups A and B (as regards the qualitative variables) was performed with the chi-square test. The comparison between the two groups (with respect to the quantitative variables) with the student test for medium and the Mann-Whitney test for the median. The chosen significance level is $p < 0.005$.

RESULTS

1: Descriptive results

Of the 5906 newborns admitted to period of 3-year, 105 were readmitted during the first months of life or 1.8%, of which 73 (70%) were born on the same site (CHIS) and 32 (30%) came from other hospitals.

A: Period from January 2010 to Mai 2011, group A: n = 16 infants

The total number of hospitalizations during this period was in 1267 of which 16 were readmitted (group A) with a readmission rates to 1.3% (Table 1). 81% of these patients were prematures. The neonates small for gestational age SGA were present in 75% of cases, 69% of infants in this group have a gestational age between 32 and 35 weeks, and 50% had a birth weight between 1500 and 2500 g. 7 (44%) of these infants were admitted for the first time for respiratory distress, 3 (19%) of them have stayed in ICU, 2 required assisted ventilation. While 7 (44%) were admitted to perinatal infection.

Patients in group A have stayed at the first hospitalization averaged 16 (10; 30) days, with an average weight of 1800 ± 378 output grams. Food autonomy was achieved in all newborns before discharge. The

average time between the exit and re-hospitalization was 14 (6; 19) days (Table 2).

The reasons for re-hospitalization in premature infants (13) of group A were: feeding difficulties with dehydration and weight loss in 31% of cases, fever and hypothermia have been present among the signs of infection in 31 and 23% of cases, respectively. One patient was readmitted for transfusion. The diagnosis of nosocomial infection was retained in 77% and viral infection was retained in 31% of premature infants in this group (Table 3).

All newborn term infants in this group were readmitted to hospital-acquired infection (Table 4).

The evolution of newborns in group A was marked by a death rate of 25% (Table 2).

Table 1: Rehospitalization rates depending on the time

Period	Number of rehospitalisations	Total number of hospitalisations	Rate of rehospitalisation %
De janvier 2010 à Mai 2011	16	1267	1,3
De juin 2011 à décembre 2012	89	4639	1,9

P= 0.11

Table 2: Epidemiological characteristics and evolution in both groups readmission

	Groupe A n= 16	Groupe B n= 89	P
Maternal age			
<20 years	3 (19%)	11 (13%)	0.7
20-35 years	9 (56%)	59 (66%)	
>35 years	4 (25%)	19 (21%)	
Gestationnel age			
28-32 WA	1 (6%)	10 (11%)	NS
32-35 WA	11(69%)	41 (46%)	NS
>35 WA	4 (25%)	38 (43%)	NS
Hypotrophy	12 (75%)	61 (69%)	0.7
Prematurity	13 (81%)	52 (58%)	0.08
ICU stay	3 (19%)	14(16%)	0.7
Average length of hospital stay (Day)	16 (10 ; 30)	8 (5 ; 13)	0.009
Output weight first hospitalization	1800 ± 378	2150 ± 780	0.08
Time between discharge and readmission (Day)	14 (6 ; 19)	12 (6 ; 18)	0.7
Readmission Weight	1757 ± 338	2118 ± 768	0.0
Average duration of rehospitalization	7.5 ± 5.6	8.5 ± 4.8	0.1
Output Weight (g)	1950 ± 381	2320 ± 720	0.1
Death	4 (25%)	4 (4.5%)	0.01

Table 3: Key readmission patterns and trends in premature infants of both groups

	Groupe A n= 13	Groupe B n= 52	P
Power difficulty	4 (31%)	27 (52%)	0.17
Dehydration and weight loss	4 (31%)	18 (35%)	1
Respiratory distress	5 (38,5%)	14 (27%)	0.49
Hypothermia	3 (23%)	11 (21%)	1
Fever	4 (31%)	16 (31%)	1
Jaudnice	-	3 (6%)	NS

Hypoglycemia	1 (8%)	8 (15%)	0.5
Transfusion	1 (8%)	13 (25%)	0.08
Nosocomial infection	10 (77%)	34 (65%)	0.7
Viral infection	4 (31%)	11 (21%)	0.7
Death	3 (23%)	3 (5.8%)	0.08

Table 4: Key readmission patterns and trends in full-term infants of both groups

	Groupe A n= 3	Groupe B n= 37	P
Power difficulty	1 (33%)	19 (51%)	NS
Dehydration and weight loss	1 (33%)	13 (35%)	NS
Respiratory distress	1 (33%)	17 (46%)	NS
Hypothermia	2 (67%)	1 (2.7%)	0.01
Fever	1 (33%)	25 (68%)	0.2
Jaudnice	1 (33%)	1 (2.7%)	-
Hypoglycemia	(0%)	1 (2.7%)	0
Transfusion	(0%)	2 (5%)	0.8
Nosocomial infection	3 (100%)	23 (62 %)	0.5
Viral infection	- (0%)	11 (30%)	0.5
Death	1 (33%)	1 (2.7%)	0.019

B: The period from June 2011 to December 2012, group B: n = 89 infants

The total number of hospitalizations during this period was 4639 of which 89 were readmitted (group B) with a readmission rates to 1.9% (Table 1). 58% of patients were readmitted prematures. SGA were present in 69% of cases. 46% of infants in this group have a gestational age between 32 and 35 weeks, and 55% had a birth weight between 1500 and 2500 g. 38 infants (43%) were admitted for the first time respiratory distress, 14 of them stayed in the intensive care unit with 10 required assisted ventilation.

While 14 infants (16%) were admitted to perinatal infection. The average length of stay in the first hospitalization in patients of Group B 8 (5; 13) days, with an average weight of 2150 ± output 780 grams. Food autonomy was achieved in all newborns before discharge without any objective way to evaluate it. The average time between the exit and re-hospitalization was 12 (6, 18) days (Table 2). The reasons for re-hospitalization in premature infants in group B were feeding difficulties with dehydration and weight loss in 52 and 35% respectively, fever and hypothermia have been present among the signs of infection in 31 and 21% cases respectively. 3 (6%) preterm infants were admitted for jaundice, and 13 (25%) were readmitted for anemia requiring transfusion.

The diagnosis of nosocomial infection was retained in 65% of cases and viral infection was retained in 21% of premature infants in this group (Table. 3). Newborns term of this group were readmitted for nosocomial infection in 62% of cases followed by viral infection in 30% of cases. The development of newborns of Group B, was marked by a death rate of 4.5% (Table.2) Diagnosis of nosocomial infection is retained on the presumption of arguments since the seeds have been isolated in a third of cases, and represented mainly by *Klebsiella pneumoniae* and *Pseudomonas*.

2: Comparative results

Rehospitalization rates during the period January 2010 to May 2011 was 1, 3%, and the period from June 2011 to December 2012 was 1.9%. There was no significant difference (univariate analysis χ^2) between the two periods regarding rehospitalization rates ($p = 0.11$) (Table 1). There was no significant difference between groups A and B in relation to gestational age, birth weight, SGA, initial reason for

admission, stay in intensive care unit, assisted ventilation, corrected age, the output weights, the average time between the release and re-admission, readmission reasons: feeding difficulties, dehydration and weight loss, metabolic signs, signs of infection, nosocomial infection, viral infection, rehospitalization life.

A statistically significant difference was found in the average length of stay at the first hospitalization was significantly reduced from 16 days to 8 days first period the second period ($p = 0.009$). The evolution was marked by a significantly reduced death rate for group B 4.5% against 25% in group A ($p = 0.01$) (Table 2). The death rate was decreased in preterm group B (5.8%) compared to preterm group A (23%) (Table 3). the death rate was significantly decreased in full-term newborns group B (2.7%) compared to full-term newborns group A (30%) (Table 4).

DISCUSSION

In our series readmissions were more interested prematures between 32-35WA, 38% of all readmissions. Brissaud O. *et al.* compared the major of premature readmission rates before and after the introduction of a specific procedure output of major preterm infants from the neonatal units. The comparison showed no significant difference in readmission rates ^[1].

In our series, the comparison of the two groups of infants before and after the introduction of new management protocols in neonatal unit showed no significant difference in readmission rates which is considered a success, since we managed to significantly increase the total number of newborns hospitalized and managed service: 1 267 hospitalizations the first period against the 4639 in second period.

We also managed to significantly reduce the average length of hospital stay, from 16 to 8 days, which would have a positive impact by minimizing the risk of nosocomial infection and freeing spaces for any other hospitalizations. The implementation of an early exit policy in neonatology did not increase the rate of readmission among newborns at term ^[3]. Yüksel *et al.* ^[4] have shown the existence of a link between the risk of rehospitalization and gestational age. In contrast, in the study of Hakulinen *et al.* ^[5], children without chronic morbidity had the same rate of readmission regardless of gestational age.

Some authors have found other variables correlated with the risk of readmission: male gender, and intrauterine growth retardation. Breastfeeding is protective for the risk of readmission. Randomized controlled trials have shown that the early exit is beneficial and economical at the same time, while the prolonged hospital stay has many negative points, including delaying the mother-child bond, reducing time of breastfeeding, reducing the time spent for the care of sick children, increasing the risk of nosocomial infections and the high cost.

Makacho *et al.* concluded that the early exit with premature introduction of a parental supports and home nursing visits could reduce the need for consultations with neonatal emergencies ^[6,7].

It is found that breastfeeding is protective against readmission. It has been shown that breastfeeding may protect against gastro-intestinal and respiratory infections ^[8].

The American Academy of Pediatrics established a recent recommendations for the release of newborns at high risk in 4 categories: preterm infants, children requiring specific technical care (enteral nutrition, nasal oxygen therapy , stomy ...), the child with psychosocial risk and accompanying the death of a child at home (organization of palliative care). The organization of the output of a newborn must begin early enough in the hospital, it must involve parents, neonatologist, nursing service, home hospitalization, psychologist and assistant social ^[2].

The causes of rehospitalization are different depending on the initial gestational age. In France, in the 1997 cohort EPIPAGE among preterm infants born before 29 SA 376, 178 were readmitted at least once, 55% for respiratory disorders. For newborns after 33 weeks, the main causes of rehospitalization are similar to those of newborn term infants: jaundice, feeding and / or dehydration difficulties^[9,10]. In our study the causes of rehospitalization are represented primarily by nosocomial infection in premature infants (66%) as in term neonates (67%), feeding difficulties (48%) associated with weight loss in 34% of cases viral infection (24%) and respiratory distress (35%).

The study of Escobar et al included 6054 newborns hospitalized in intensive care; 165 (2.72%) were readmitted within 14 days of discharge; 41.2% of readmissions occur within 3 days of discharge, 29.7% within 4 to 7 days and 29.1% during the second week^[11]. Jaundice (37.6%) and feeding difficulties (15.8%) are the two most common causes of hospital readmission followed by viral infections (12.8%), pyelonephritis (2.4%), and apnea (5.5%). After the implementation of new protocols in our unit it was found that the death rate of readmitted patients was significantly reduced in newborn term infants from 33% in group A at 2.7% in group B ($p = 0.019$) and significantly decreased in premature infants by 23% in the 5.8% group A to group B.

CONCLUSION

In our series the establishment of a new management protocol allowed a considerable gain in the number of patients cared for in the neonatal unit, it also reduced the average length of stay in the unit having the advantage of minimizing the risk of infection in newborns and increase the capacity of the service to receive newborns who require hospitalization. Also, mortality during the second period has been significantly reduced without affecting the rehospitalization rates. Nevertheless the main cause of rehospitalization was nosocomial infection in both periods which encourages us to strengthen infection prevention measures.

Future Scope

We will work initiated similar research in 2015, the results will be the basis for further management in different neonatal units in the country.

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Conflicts of Interest: None.

Author's contributions

MA.Radouani; N. Chahid; Y. Taboz; H.Taboz; H. Aguenou: Collect data, analyze results, writing the manuscript. Amina Barkat: Analyze results, reading and correcting the manuscript.

REFERENCES

1. Brissaud O, Babre F, Pedespan L, Feghali H, Esquerré F, Sarlangue J. Réhospitalisation dans l'année suivant leur naissance des prématurés d'âge gestationnel inférieur ou égal à 32 semaines d'aménorrhée. Comparaison de 2 cohortes : 1997 et 2002. Arch pédiatr 2005, 12 : 1462–1470
2. Biran V, Gaudin A, Farnoux C, Maury L, Baud O, Aujard Y. Réhospitalisations précoces après sortie de Néonatalogie. Arch Pédiatr 2009; 16:711-712
3. Anne M, Marbella MS, veerapa K, Chetty, Ptere M. Neonatal hospital lengths of stay, readmissions and charges. Pediatrics 1998 january, 101
4. Yuksel B, Greenough A. Birth weight and hospital readmission of infants born prematurely. Arch Pediatr Adolesc Med 1994; 148: 384-8.
5. Hakulinen A, Heinonen K, Jokela V, Launiala K. Prematurity-associated morbidity during the first two years of life. A population-based study. Acta Paediatr Scand. 1988;77(3):340-8.
6. Kacho MA, Pasha YZ and Aliabadi BM. Outcomes of very-low-birthweight infants after discharge with a discharge weight of 1500 grams. Pediatrics International. 2012 54, 196-199
7. Oscar G, Mckenzie ME, Mcfadyen L, Shapiro C, Sechia MK, Macdonald N, and all. Earlier discharge with community-Based intervention for low birth weight infants: a randomized trial. Pediatrics 1993 July 92
8. Martens PJ, Derksen S, and Gupta. Predictors of Hospital Readmission of Manitoba Newborns within Six Weeks Post birth Discharge: A Population-Based Study. Pediatrics 2004, 114: 708-713
9. Gabriel J, Escobar, Reese H, Clark, and John D, Greene: Short-Term Outcomes of Infants Born at 35 and 36 Weeks Gestation: We Need to Ask More Questions. doi:10.1053/j.semperi.2006.01.005
10. Escobar G, Greene J, Hulac P, Kincannon E, Bischoff K, Gardner M, and all. Rehospitalisation after birth hospitalisation: patterns among infants of all gestations. Arch Dis Child. 2005 February; 90(2): 125–131.
11. Escobar GJ, Joffe S, Gardner MN. Rehospitalization in the first two weeks after discharge from the neonatal intensive care unit. Pediatrics. 1999; 104:1-9.