ISSN: 2996-0940
Research Article

Science Set Journal of Ophthalmology and Eye Care

Prophylaxis of Neonatal Ophthalmia: Experience of the Private Medical-Surgical Center Persis (CMCPP) in Ouahigouya

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Submitted: 04 November 2024 **Accepted:** 08 November 2024 **Published:** 16 December 2024

https://doi.org/10.63620/MKSSJOEC.2024.1022

Citation: *Amadou, O., Jean, L. Kambire, Rassidou, G., Gabriel, S., Habi KY., Boyam, F. Yameogo, Diallo, R., Souleymane T., (2024). Prophylaxis of Neonatal Ophthalmia: Experience of the Private Medical-Surgical Center Persis (CMCPP) in Ouahigouya. Sci Set J of Ophthalmology & Eye Care, 3(4), 01-05.*

Abstract

Introduction: *Ophthalmia or neonatal conjunctivitis is an inflammation of the conjunctiva during the first 28 days of life. Prevention using the Crede method is recommended. The maternity unit of the Ouahigouya CMCPP offered to experiment with this prophylaxis by administering a drop of gentamycin 0.3% eye drops in the delivery room.*

Method: *This was a descriptive cross-sectional study with prospective data collection, carried out in the maternity ward from 24/02/2023 to 23/01/2024. The study included neonates born via the upper or lower route who had received a drop of gentamycin 0.3% eye drops in the delivery room.*

Resuscitated neonates and neonates with malformations were excluded.

Results: *In one year, 1223 newborns were registered, 1218 of whom were included in the study, with a sex ratio of 1.08. The mean age of patients was 11 days, with extremes of one day and 24 days.*

During the study, 35 cases of neonatal conjunctivitis were recorded, representing a prevalence of 2.8% and an incidence rate of 0.001044 cases per person-day. There were 30 vaginal births and 5 caesarean sections. Secretions were purulent in 25% of cases and mucopurulent in 75%. Cases of conjunctivitis were treated locally with an antibiotic for one week, with favourable results in all cases. Sixty-four boxes of gentamycin were used instead of 1218, representing a 94.74% reduction in financial costs.

Conclusion: *Prophylaxis of neonatal conjunctivitis by administering a drop of gentamycin 0.3% eye drops in the delivery room is an effective and efficient measure. Nationwide implementation could help reduce the cost of neonatal care in Burkina Faso.*

Keywords: Neonatal Conjunctivitis, Prophylaxis, Cost, Efficiency, Burkina Faso

List of Abbreviations

- **CMCPP:** Persis Private Medical and Surgical Centre
- **WHO:** World Health Organisation
- **IT:** Incidence Rate
- **PCR:** Polymerase Chain Reaction
- **CFA:** African Financial Community franc
- **USD:** United States dollar
- **F:** Female
- **M:** Male
- **mg:** milligram
- **kg:** kilogram

Introduction

According to the WHO, ophthalmia or conjunctivitis neonatorum is an inflammation of the conjunctiva that occurs during the first 28 days of life [1]. The prevalence of this condition is in the region of 1% to 50%, depending on the germs involved [2]. this generally benign condition can lead to corneal ulceration, perforation of the eyeball and even blindness in the case of infection with Neisseria gonorrhoeae. These disastrous consequences justify early detection and, better still, prevention of this condition. The original description of this prophylaxis was written by Carl Sigmund Franz Crede in 1881 [3]. In Africa, health workers responsible for maternal and child health are not always familiar with Crede's method. In Cameroon, Josiane Mare Njoya et al, in their study of the town of Garoua, found that most maternity ward staff had insufficient knowledge and practices to prevent the onset of neonatal conjunctivitis [4]. In Burkina Faso, this prophylaxis is recommended and is an integral part of essential newborn care.

However, its implementation varies from one centre to another. Traditionally, a local antibiotic such as gentamycin 0.3% eye drops is prescribed for instillation for one week. The maternity unit at the Centre Médico-Chirurgical Privé Persis in Ouahigouya has experimented with this prophylaxis by having nursing staff administer a single drop of gentamycin 0.3% eye drops in the delivery room. We were interested in the impact of this prophylaxis.

Materials and Methods

This was a descriptive cross-sectional study with prospective data collection. It was carried out in the maternity ward of the Ouahigouya CMCPP from 24/02/23 to 23/01/24. Neonates born in the maternity ward of the Ouahigouya CMCPP by the vaginal or vaginal route who had received a drop of gentamycin collyrium in the delivery room were included in the study. Once opened, the 5 ml bottles of gentamycin 0.3% eye drops were stored at room temperature and were not used after seven days. Cord care and prevention of neonatal haemorrhagic disease were combined. Resuscitated neonates and neonates with malformations were not included in this study.

Results

Epidemiological data

In one year, 1223 newborns were registered, 1218 of whom were included in the study; of these newborns, 633 were male and 585 female, giving a sex ratio of 1.08. During the study period, 35 cases of neonatal conjunctivitis were registered, giving a prevalence of 2.8%. Sixteen patients were male and 19 female, giving a sex ratio of 0.84. The mean age of the patients was 11 days, with extremes of one day and 24 days. All patients were from the town of Ouahigouya.

In our case study, we followed 1218 children from birth to 28 days of age. Of these 1218 children, 35 contracted conjunctivitis between birth and day 28. The table below (Table I) shows the different ages at which cases of neonatal conjunctivitis were observed.

Table 1: Cases of ophthalmia neonatorum

Number	Gender	Date of birth	Date of onset of conjunctivitis	Age of onset of conjunctivitis
1	F	29/03/2023	11/04/2023	13
2	M	30/03/2023	19/04/2023	20
3	F	06/04/2023	11/04/2023	5
4	M	07/04/2023	12/04/2023	5
5	M	26/04/2023	07/05/2023	11
6	F	27/04/2023	06/05/2023	9
7	F	29/04/2023	06/05.2023	7
8	F	01/05/2023	21/05/2023	20
9	M	03/05/2023	09/05/2023	6
10	M	10/05/2023	18/05/2023	8
11	M	01/08/2023	25/08/2023	24
12	F	07/08/2023	12/08/2023	5
13	F	09/08/2023	26/08/2023	17
14	M	11/08/2023	02/09/2023	22
15	F	12/08/2023	23/08/2023	11
16	M	12/08/2023	19/08/2023	7
17	M	18/08/2023	07/09/2023	20
18	M	20/08/2023	07/09/2023	18

19	F	23/08/2023	30.08/2023	7
20	F	01/09/2023	02/09/2023	1
21	M	05/09/2023	19/09/2023	14
22	F	08/09/2023	16/09/2023	8
23	F	09/09/2023	23/09/2023	14
24	M	11/09/2023	23/09/2023	12
25	F	14/09/2023	02/10/2023	18
26	F	24/09/2023	02/10/2023	8
27	M	18/10/2023	22/10/2023	4
28	M	25/10/2023	03/11/2023	9
29	M	27/11/2023	09/12/2023	12
30	F	15/12/2023	22/12/2023	7
31	M	15/12/2023	23/12/2023	8
32	F	21/12/2023	26/12/2023	5
33	F	01/01/2024	15/01/2024	14
34	F	10/01/2024	18/01/2024	8
35	F	12 /01/2024	21/01/2024	9

The prevalence and incidence rates calculated for our case study are summarised as follows:

$$\textbf{Prevalence: } \frac{35}{1218} \times 100 = 2{,}874\%$$

For the Incidence Rate (IR), here are the detailed steps in the calculation:

1. Total number of newborns: 1218.
2. Number of newborns who developed conjunctivitis: 35.
3. Duration of exposure:
   - For newborns who developed conjunctivitis, the duration of exposure is the number of days from birth until the onset of conjunctivitis (Age of onset of conjunctivitis column).
   - For children who did not develop conjunctivitis (1218 - 35 = 1183 children), the duration of exposure is 28 days for each child.
4. Total person-days for newborns who developed conjunctivitis: 13+20+5+...+14+8+9= 386 person-days
5. Total person-days for newborns who did not develop conjunctivitis = 1183×28=33124 person-days
6. Total person-days for all newborns: 386+33124= 33510 person-days

$$\text{Incidence Rate} = \frac{35}{386+33\,124} = 0{,}001044$$

The TI is 0.001044 cases per person-day. This means that there were 35 cases of conjunctivitis for 33510 patient-days, or 1 case per 1000 person-days, or for 1015 patient-days, there was one case of conjunctivitis.

Clinical Data

Of these cases of conjunctivitis, 30 were born by vaginal delivery and 5 by caesarean section. The secretions were purulent in 25% of cases and mucopurulent in 75%. No swabs were taken to isolate germs, and no PCR tests were performed.

Treatment and Outcome

All cases of conjunctivitis were treated with Rifamycin 1000 000 UI eye drops for seven days. All patients had a favourable outcome.

Cost of prophylaxis for ophthalmia neonatorum

Table 2: Description of the number of boxes of gentamicin eye drops.

Month	Number of newborns	Boxes of gentamycin eye drops used	Gentamycin box savings
February -23	18	1	17
March- 23	76	4	72
April -23	103	5	98
May -23	116	7	109
June -23	118	6	112
july -23	69	4	65
August -23	129	7	122
September -23	152	8	144

October- 23	125	7	118
November-23	128	7	121
December- 23	104	4	100
January -24	80	4	76
Total	1218	64	1154

For this prophylaxis of ophthalmia neonatorum, 64 boxes (Table 2) of gentamycin eye drops costing 200 CFA francs each were used, giving an overall cost of 12800 CFA francs, or 21.22 US dollars (1 dollar = 603.10 CFA francs). Instead of 1218 boxes of gentamycin eye drops, which would have cost 243600 CFA francs, or 403.91 US dollars, resulting in a 94.74% reduction in financial costs.

$$\frac{243600 - 12800}{243600} * 100 = 94{,}74\%$$

Discussion

The ocular prophylaxis of ophthalmia neonatorum initiated by Crede in 1881 has led to a major reduction in the incidence of this condition and its complications [3]. In our study, the prevalence of this condition was 2.8%. This frequency is comparable to that of Vonor and colleagues in Togo, with 4.4% of cases [6]. It is lower than that of Ayéna in Togo, who found 8% [7]. According to a review of the literature, the prevalence of this condition ranges from 1% to 50%, depending on the germs involved [2]. The mean age of patients was 11 days, comparable to that found by Vonor and colleagues in Togo, which was 10.9 days [6].

The sex ratio in our series was 1.08, comparable to that reported by Vonor and colleagues in Togo, which was 1.01[5]. No sexual predominance has been described in this condition; its appearance is linked to exposure to risk factors. Several factors have been identified in the literature review; Vonor and colleagues found vaginal delivery in 98.7%, early rupture of the water sac in 21.4%, absence of antenatal consultations in 44% and the presence of signs of sexually transmitted infections in 31.4% [6]. In our study, vaginal delivery was incriminated in 85.7% of cases. Ophthalmia neonatorum is manifested by conjunctival hyperhaemia and a mucopurulent or purulent discharge. Mucopurulent discharge predominated in our series.

There are many possible causes of ophthalmia, including chemical, bacterial and viral factors. In the series by Vonor and colleagues, cytobacteriological examination led to the isolation of staphylococcus aureus in 2 cases; in our series, no samples were taken. However, in developed countries, etiology is routinely investigated using cytobacteriological examination or Polymerase Chain Reaction (PCR) tests. In Finland, Mina Honkila et al used PCR to detect Chlamydia trachomatis and Neisseria gonorrhoeae [8].

Some countries have guidelines on prophylaxis for conjunctivitis in newborns [9]. The Canadian Paediatric Society recommends three measures to prevent neonatal conjunctivitis:

- Neonatal eye prophylaxis with erythromycin
- Screening and treatment of pregnant women with sexually transmitted infections
- Management of exposed newborns. For this management, it recommends ceftriaxone injection 50 mg/kg or cefotaxime injection 100 mg/kg [2].

In our series, gentamycin 0.3% eye drops was used for prophylaxis and Rifamycin 1 000 000 IU eye drops for seven days was used to treat conjunctivitis.

Our study on the prophylaxis of conjunctivitis in newborns is more economical because instead of using one bottle per patient, we use one bottle for several newborns. This practice avoids misuse and applies the recommendation of the Burkina Faso Ministry of Health at a lower cost. Consequently, the CMCPP's experience is efficient because it guarantees the effective administration of eye drops and greatly reduces the costs associated with this prophylaxis.

The staff at the maternity unit of the Ouahigouya CMCPP have demonstrated individual and nominative delivery by making gentamycin eye drops available in the delivery room and administering them to the patient at the appropriate time.

This practice of instilling a drop of antibiotic immediately after delivery is similar to antibiotic prophylaxis. However, the attitude of health workers in Burkina Faso to prescribe an antibiotic in the form of eye drops or ophthalmic ointment to be instilled several times a day for a week goes beyond the requirements of antibiotic prophylaxis. It is more akin to the requirements of antibiotic therapy. In Senegal, Modou, Gueye et al also described the instillation of antibiotics for 7 days for the prophylaxis of neonatal conjunctivitis by certain practitioners [10].

Gentamycin was the drug used for prophylaxis in our study. This drug is commonly used in practice because it is more affordable in Burkina Faso. Silver nitrate, which used to be prescribed, is no longer manufactured worldwide. Practices concerning the prophylaxis of neonatal conjunctivitis are disparate and poorly described in the literature. This fact was confirmed in a meta-analysis in which Elisabeth K et al revealed that there were no data on the molecules used for the prophylaxis of neonatal conjunctivitis [11].

Prophylaxis of neonatal ophthalmia during the study proved to be a less costly practice and in line with the policy of individual and nominative dispensing of medicines in Burkina Faso. Practices for prophylaxis of neonatal ophthalmia need to be harmonised in Burkina Faso. Microbiological and economic studies will also help.

The limitations of our study were the lack of comparison of efficacy and safety between gentamycin and another drug such as erythromycin, and the lack of identification of ocular germs.

Conclusion

Neonatal ophthalmia remains a major concern for maternity and paediatric departments. Prophylaxis by administering a drop of gentamycin 0.3% eye drops in the delivery room is an effective and efficient measure. A nationwide roll-out could help reduce the cost of neonatal care in Burkina Faso.

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