

---

---

# NOSOCOMIAL INFECTIONS AS A MAJOR CAUSE OF SEPSIS IN ADMITTED NEONATES

Azmat Talaat, Brekhna Aurangzeb, Fazalur-Rahim

*Department of Paediatrics,  
Khyber Teaching Hospital,  
Peshawar*

## ABSTRACT

**Objectives:** To determine the causes of nosocomial infection in admitted neonates having clinical or bacteriological proven sepsis.

**Material and Methods:** A retrospective analysis of 100 neonates admitted to neonatology unit of a teaching hospital, having clinical or bacteriological evidence of sepsis. History and laboratory data was scrutinized to collect relevant information.

**Results:** Out of 100 neonates, 58 were females and 42 were males. 63 patients were preterm and 37 were term infants. 68 patients were delivered at home and 32 were delivered in hospital. In 15 patients, mother had some perinatal infections and in 28 cases mothers had prolonged rupture of membranes. In 57 cases, no maternal or neonatal cause of infection was found and these babies acquired nosocomial or hospital acquired infection.

**Conclusion:** Nosocomial infections are very common in our setup. Stringent methods are recommended to improve the basic hygiene of our neonatal units.

**Key words:** Nosocomial infection, Neonatal, Sepsis.

---

## INTRODUCTION

Infection remains one of the major cause of mortality and morbidity in neonates the world over. With increasing survival of low gestational neonates and the

use of life support machines with more of invasive procedures infection has emerged as a increasing threat. In the developed world the risk factors for nosocomial infections in these critically ill neonates are identified and to certain extent controlled. Unfortunately in the developing world

nosocomial infection remains a major risk factor adding to a very high neonatal mortality.

## MATERIAL AND METHODS

A retrospective study was done in neonates, who were clinically and bacteriologically were septic. This study was done over a two years period in a teaching hospital neonatal unit. History and laboratory data was scrutinized and relevant information extracted. This information gave different demographic features like gestation, sex, maternal and neonatal factors which may have contributed to the sepsis.

## RESULTS

Total number of cases studied were one hundred. Out of these total number, 58 (58%) were females and 42 (42%) were males. Out of the total number, 63 (63%) were preterm and 37 (37%) were term infants. Sixty eight (68%) were delivered at home and 32 (32%) were delivered in the hospital.

Amongst these 68 (68%) delivered at home, 40 (58.8%) were assisted by the relatives and 28 (41.17%) were assisted by Lady health visitor or dais.

Amongst the total of 100 cases 15 (15%) were those infants in whom the mother had history of some acute infection just before or during delivery, which could account for the neonatal admission.

In 28 (28%) neonates the mothers had prolonged rupture of membranes thus accounting for the infant sepsis.

In these 43 (43%) some maternal cause could be identified for their impending infection. These infants presented to the neonatal unit with the following presentation either singly or in combination.

- Prematurity. n=33 (76.7%).
- Listlessness/lethargy. n=30 (69.76%).
- Cyanosis. n=17 (39.5%).
- Hypothermia. n=28 (65%).
- Hyperthermia. n=15 (34.8%).
- Congenital abnormalities. n=7 (16.2%).
- Tachypnoea n=28 (65%).
- Reluctant to feed. n=32 (74.4%).
- Irritability. n=18 (41.8%).
- Infant of Diabetic mothers. n=4 (9.3%)
- Sclerema. n=12 (27.9%).

One of the significant result was that 57 (57%) neonates presented to the unit in which there was no maternal or neonatal cause to account for their illness. Out of these 45 (78.9%) were admitted for prematurity, 8 (14%) suffered from birth asphyxia, 1 (1.75%) admitted for Erb's Palsy, 2 (3.5%) admitted as previous sibs had unexplained fits, and 1 (1.75%) was admitted as mother died during delivery.

These above mentioned neonates had no signs or symptoms of infection at admission and developed the initial signs and symptoms after a period ranging from 48 to 72 hours, giving rise to the suspicion that these babies may have acquired a nosocomial or hospital borne neonatal infection.

Procedures performed in the neonatal unit which may have contributed to the nosocomial infections.

1. Intravenous cannulation in n=100 (100%).
2. Umbilical Catheterisation. n=24 (24%).
3. Some form of parenteral n=10 (10%).

- |                                |             |
|--------------------------------|-------------|
| 4. Endotracheal intubation.    | n=15 (15%). |
| 5. Nasogastric tube insertion. | n=85 (85%). |

Risk factors that we identified may have contributed to the hospital acquired infection.

1. Infrequent or improperly washed hands.
2. Wearing of wrist watches, rings, bangles and full sleeved shirts by the staff members.
3. Excessive and unnecessary handling of neonates by the staff and family members.
4. Handling of the neonates by untrained staff members like ward boys, domestic ladies.
5. Not properly sterilized incubators, head boxes and other equipment.
6. Oxygen supply and dirty tubes.
7. Cleaning of the unit with unclean scrubs and clothes.
8. Frequent intravenous cannulation.
9. Repeated use of the same infusion chamber and drip sets.
10. Puncturing the drips.
11. Untrained staff, with no prior knowledge of neonatal units.
12. Lack of staff.
13. Allowing visitors and eatable to the unit.
14. Colonized patients.
15. Colds and flu in the care givers.
16. Multiple dose medications.

**Out come**

- |                   |             |
|-------------------|-------------|
| Infants improved. | n=72 (72%). |
| Died              | n=28 (28%). |

## DISCUSSION

The developing world faces a high infant mortality. This being 10 to 15%<sup>1</sup>. Infection is one of the major cause of neonatal mortality and morbidity<sup>2</sup>. Beside some important neonatal and maternal causes, hospital borne or nosocomial infection remains a major threat<sup>3</sup>. With increase in the survival of very small gestational neonates, use of sophisticated machines and techniques with increase in the invasive procedures have brought nosocomial infection as a ever greater threat in the advanced world<sup>4</sup>. Unfortunately in the under-developed nations the very basics of controlling infection in a neonatal unit being ignored, results in a high infant mortality and morbidity<sup>5</sup>.

A healthy immunocompetent full term infant survives well in an environment full of microorganisms. Unwell sick term and especially preterm infants who in addition are immunocompromised succumb to infection quite easily<sup>6</sup>.

Infection in the neonate can spread by various methods, e.g. transplacental transmission, ascending infection after prolonged rupture of membranes and other infections from the birth canal<sup>7</sup>. Congenital abnormalities in the neonates, contact with an infected person after birth and from the surrounding environment<sup>8</sup>. Rate of infection amongst high risk infants vary indifferent centers<sup>9</sup> and are of economic concern as there is extra cost of prolonged hospital stay<sup>10</sup>.

An ill neonate who is subjected to invasive procedures gets breach in their host defense mechanism either mechanically or immunologically. Reservoir of nosocomial pathogens includes hospital inanimate environment, patient and equipment colonization an dissemination by carriers. If care is

not taken these micro-organism very easily invade the blood stream of the already immunocompromised host. To control the epidemic spread of this acquired infection a surveillance program of these units has to be done and risk factors identified<sup>11,12</sup>.

By and large we have identified in our study that the most common risk factors are easily recognized and if properly eliminated will improve the mortality and morbidity. Colonized and infected neonates should be identified, closed intravenous system should be maintained, the equipment used should be thoroughly disinfected before reuse and stringent measures should be adopted by the care givers is not promoting infection in a neonatal unit<sup>13</sup>. A very important but simple method is by enforcing strict handwashing before and after touching any-neonate<sup>14,15</sup>.

As neonates are generally prone to infection and can quickly become septicaemic it is therefore very important to recognize subtle signs and symptoms infection and resort to early neonatal septic screening<sup>16,17</sup>.

In our setup we seldom resort to high technical methodology because of lack in financial and human resources and expertise. It is therefore basically our hospital environment and human source which is contributing to a very high rate of nosocomial infection and unfortunately making these lethal bacteria more resistant to commonly used antibiotics<sup>18</sup>. Stringent methods are therefore recommended to improve the basic hygiene of our neonatal units, strict handwashing, sterilization and proper cleaning of head boxes and incubators which act as virtual isolation for the ill neonate, closed intravenous methods and trained staff who are able to recognize the threat of nosocomial infection will not improve the overall care but will bring the infant mortality considerably down.

## REFERENCES

1. Kaushik. SL, Parmar VR, Grover N. Neonatal sepsis in hospital born babies. *J Commun Dis* 1998; 30 (3): 147.
2. MMWR Morb Mortal Wkly rep. Monitoring hospital acquired infections to promote patient safety-United States, 1990-1999. 2000; 49: 149.
3. Davies MW, Mehr. S, Garland S.T. Bacterial colonization of toys of neonatal intensive care costs; *Paediatrics* 2000; 106: 18.
4. Shah SS, Ehrenkranz AR Increasing incidence of gram-negative rod bacteremia in a newborn intensive care unit. *Paed Infect Dis J* 1999; 18: 591.
5. Abbasi AS, Karamat, KA, Hafeez, A. An outbreak of neonatal sepsis in a nursery. *PPJ* 1999; 15: 149.
6. Sandber AU, Fath K, Berger. Preterm infants with low immunoglobulin G levels have increased risk of neonatal sepsis, but do not benefit from prophylactic immunoglobulin GA, *J Paeds* 2000; 137 (5): 623.
7. Mbu RE, Tchio R, Leke, RJ. Premature rupture of membranes: Maternal and fetal outcome in the absence of antibiotic prophylaxis. *Afr J Health*. 1998; 2 (1): 26.
8. Relation of the inanimate hospital environment to endemic nosocomial infection. *NEJM* 1982; 307: 1562.
9. Moore, DL, Mayhall CG. Nosocomial infections in newborn nurseries and neonatal intensive care. units., *Hospital epidemiology and infection control*. 1996; 534.
10. Leroyer. A, Bedu. A, Lombrail. B, Desplanque. L. Prolongation of hospital stay and extra cost due to hospital acquired infection in a neonatal unit. *J Hosp Infect* 1997; 35: 37.
11. Brennan. BJ, Abrutyn. E Developing policies and guidelines. *Infect control hosp epidemiol* 1995; 16: 512.
12. Kawagoe, CAM, Segre CR, Periera. Risk factors for nosocomial infections in critically

- ill newborn: A 5 years prospective cohort study. *JY AJIC*, 2001; 29: (2): 109.
13. Terrone DA, Rinhart BK, Eistien MH et al. Neonatal sepsis and death caused by resistant *E. Coli*. *Am J Obs Gynae* 1999; 180: 1345.
  14. Steere, AC, Mallison G. Handwashing practice for prevention of nosocomial infection. *Ann Intern Med* 1975; 83; 683.
  15. Morough P, Perneger, TV. Compliance with handwashing in a teaching hospital. *Ann Intern Med* 1999; 130: 126.
  16. Gabriel J, Escobar. The neonatal sepsis work up. Personal reflections on the development of an evidence-based approach towards newborn infections in a managed care organization. *Paediatrics* 1999; 103: 360
  17. Robillard PY, Hulsey. TC., Perez JM. Evaluation of neonatal sepsis screening in a tropical area. *West Indian Med Jour* 2001; 50 (1): 37.
  18. Yurdakok. M. Antibiotic use in neonatal sepsis. *Turk J Paeds*. 1988; 40 (1) 17.

---

**Address for Correspondence:**

Dr Azmat Talaat,  
Department of Paediatrics,  
Khyber Teaching Hospital,  
Peshawar.