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Original Research Article

Clinical characteristics and outcome of neonates with neonatal mastitis: a hospital based study

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ABSTRACT

Background: Neonatal mastitis is not an uncommon condition, mostly occurs due to *Staphylococcus aureus* (*S. aureus*), sometimes leading to breast abscess with detrimental effects.
Methods: Our study was retrospective, hospital based observational study carried out at Government Medical College, Baramulla from August 2017 to August 2019, all cases with features of neonatal mastitis were included in the study and also admitted in hospital. Clinical and laboratory data along with demographic data was recorded and analysed.
Results: 23 cases were included with age of presentation 8 to 28 days. Babies particularly male babies received breast massage (N=10), besides this pain (15) and redness (N=23) was most common clinical characteristics purulent discharge seen in 2 cases and 7 cases were febrile. Laboratory findings include decreased total leucocyte count (TLC) and positive C-reactive protein (CRP), pus culture from samples revealed *S. aureus* in 11 cases, coagulase-negative staphylococci (CONS) in 3 cases, *E. coli* in 2 cases and sterile in 7 cases. Most of cases were sensitive to penicillin (N=14) and in two cases were methicillin resistant *S. aureus* (MRSA) strains resistant to methicillin. All patients responded well to intravenous (IV) antibiotics while as 8 cases required (I and D), blood cultured showed growth in 19 cases while cerebrospinal fluid (CSF) analysis was sterile in all patients. Above all babies were discharged successfully without any complications.
Conclusions: We concluded from our study that neonatal mastitis if treated early has better outcome rather than practicing misbeliefs like breast massage to express so called witch's milk, in addition we conclude that neonatal mastitis is not an uncommon problem.

Keywords: Neonate, Mastitis, *Staphylococcus aureus*

INTRODUCTION

Maternal oestrogen leads to breast enlargement 70% of new-born approximately.[1] Around 34 weeks of gestation breast bud becomes palpable.[2] Breast bud measures 1 to 2 cm in diameter in first few weeks of life.[3] Postnatal, falling maternal oestrogen levels trigger prolactin secretion neonate's pituitary gland.[1,4] Prolactinemia further stimulates neonatal breasts resulting in secretion of milk in 5-20% of neonates.[5] Neonatal secretion is popularly termed as witch's milk because of belief in folklore that goblins and witches would feed on it.[6]

Neonatal breast enlargement is self-limiting condition, parental reassurance and observation is needed.[7] Occasionally superadded infection may result in infective pathology such as neonatal mastitis which in turn may lead to breast abscess.[8-9] Neonatal mastitis is more common in female babies than male babies (2:1) and more common in term neonates than preterm babies as they have underdeveloped mammary glands unlikely to get

infected.[10] Neonatal mastitis is often unilateral and usually occurs in 2-8 weeks of life with uncomplicated mastitis seen earlier i.e. 2-3 weeks and abscesses seen 3-4 week of neonatal period.[11,12]

Neonatal mastitis is usually localised, while as systemic spread is rare and common symptom being fever found in only 25% of cases.[13] *Staphylococcus aureus* is usually main causative organism involved in 83-88% cases.[13,14] Other organisms include gram-negative bacteria like *Escherichia coli, Salmonella, Pseudomonas, Shigella* and *Klabsella*, while *Staphylococcus* epidermidis and pepto streptococcus have been reported in few cases, in addition case reports of group B streptococcus and group D streptococcus have been found in neonatal mastitis.[8,15-17] Neonatal mastitis currently respond well to antibiotics and in some cases like abscess formation Incision and drainage is required.

The present study was undertaken to study clinical characteristic and outcome in new-borns presenting with neonatal mastitis.

METHODS

Our study was retrospective, hospital based observational study carried out at Government Medical College, Baramulla from August 2017 to August 2019 after obtaining approval from ethical committee, all cases with features of neonatal mastitis were included in the study and also admitted in hospital.

Inclusion criteria

All cases of neonatal mastitis; neonatal breast abscess; and unilateral and bilateral cases were included.

Exclusion criteria

Neonates with congenital anomalies and neonates with systemic illnesses were excluded.

Clinical evaluation was done by taking careful history from parents of admitted neonate and complete examination of neonate with laboratory data like complete blood count (CBC), C-reactive protein (CRP), blood and pus culture, besides this ultrasonography and surgical interventions if needed was done in cases of neonatal mastitis of patients. Meanwhile demographic data like age, sex, birth order and residence. Clinical, laboratory and demographic date was recorded and analysed was recorded and analysed using Microsoft excel and online calculators. The statistical analysis was done using statistical package for the social sciences (SPSS) version 13.0 and variables were expressed in frequency and percentages. Statistical analysis was done by using Chi square test for significant data.

P value <0.05 was considered statistically significant.

RESULTS

In our study we enrolled 134 cases of neonatal breast enlargement (NBE), out of which only 23 cases were included in our study i.e. fulfilled inclusion criteria, among them 15 were females and 8 were males. Age of presentation was 8 to 28 day, with peak incidence in second week. Also 20 cases were term babies and 3 cases were borderline term.

Table 1: Demographic data of cases.

Gender	Frequency (n)	Percentage (%)
Male babies	8	34.7
Female babies	15	65.3
Total	23	100
Area of living		
Rural	16	69.5
Urban	7	30.5
Total	23	100

Among 23 cases of neonatal mastitis 19 cases were exclusively received breast feeding, while in 4 neonates both top and breast feeding was given. Out of 23 babies 16 were from rural areas and 7 were from urban locality. Babies particularly male babies received breast massage (N=10). Besides this pain (15) and redness (N=23) was most common clinical characteristics. Breast abscess was seen in 8 cases, while as 7 cases were febrile at time of admission with localised involvement and all of them were hemodynamic ally stable. Bilateral involvement was seen in two cases with pustulosis of skin seen in 4 cases.

Table 2: Type of feeding in cases.

Feeding	Frequency (n)	Percentage (%)
Breast feeding babies	19	82.6
Breast fed and top fed babies	4	17.4
Total	23	100

Common laboratory findings include decreased leucocyte count i.e. leukopenia (TLC <5000 cumm, N=11) was found in 11 neonates and positive C-reactive protein (CRP normal range 1.5-20 mg/l) was seen in 12 cases. Pus culture from samples particularly revealed *Staphylococcus aureus* in 11 cases, coagulase-negative staphylococci (CONS) in 3 cases-coli in 2 cases and sterile in 7 cases. Most of cases were sensitive to penicillin (N=21) and in two cases were methicillin resistant *Staphylococcus aureus* (MRSA) strains resistant to methicillin. All patients' responded well to intravenous (IV) antibiotics while as 8 cases required (I and D). Blood cultured showed growth in 19 cases, in all cases of positive blood culture cerebrospinal fluid (CSF) analysis was sterile in all patients. Above all babies responded well to treatment (IV antibiotics) while some required incision and drainage, all

babies were discharged successfully without any complications.

Table 3: Clinical features in neonatal mastitis.

Clinical profile	Frequency (N)	Percentage (%)
Redness	23	100
Pain	15	65.2
Fever	7	30.4
Breast abscess	8	34.7
Pustulosis of skin	4	17.3

P value <0.01, significant

Table 4: Aetiology in neonatal mastitis.

Aetiology (causative organism)	Frequency (n)	Percentage (%)	P value
Staphylococcus aureus	11	48	<0.01 (significant)
CONS	3	13	
E. coli	2	9	
Others	7	30	

DISCUSSION

Neonatal mastitis, an infection of breast tissue is not an uncommon condition. Neonatal mastitis respond well to antibiotics and in some cases incision and drainage is required and is associated with better outcome. In our study female neonates (N=15, 65.2%) were involved as compared to males (N=8, 34.7%) because of prolonged breast hypertrophy in females, which is also reported by other studies.[9,13] Also 20 neonates (86.9%) in our study were term babies and 3 (13%) new-borns were borderline term which is consistent with other studies.[7,9,10] As preterm babies have underdeveloped mammary tissue less likely to get infected.

Most of the babies were exclusive breast fed (N=19, 82.6%) while some new-borns were both breast and top fed (N=4, 17.3%) which is consistent with other studies, where transmission of microorganisms have been reported to occur through breast milk.[18] Breast massage is done due to cultural misbeliefs which is also seen in our country to express secretions in order to reduce breast mass (Witch's milk) as in our study about 10 new-born's (N=10, 43.4) particularly male babies received breast massage which is concurrent as reported in other studies.[19-21] Red swollen breasts were seen in almost all cases (100%) in our study ,and most of cases were asymptomatic with minimal symptoms as is reported in other studies.[13]

In our study 8 patients (34.7%) had breast abscess on ultrasonography (USG), which is consistent as reported by Ruwaili et al and Masoodi et al.[9,12] *Staphylococcus aureus* is main causative organism in neonatal mastitis as seen in our study (47.8%), which is also reported by other studies.[8,10,13] While as gram negative bacteria, CONS are also reported by other studies, to be causative agents in neonatal mastitis which is also seen in our study.[15,12]

In our study, all cases received IV antibiotics for 3 to 5 days, which is consistent as reported by other studies.[7-9] While switch to oral therapy was based on clinical basis as reported in other studies.[7-9] In our study, no recurrence of illnesses was seen in study patients.

Limitations

The main limitation in our study was small sample size, which can in future be corrected by analysing large study group so that our research regarding neonatal mastitis can be further strengthened.

CONCLUSION

From our study, we conclude that early treatment of neonatal mastitis results in better outcome and reduces risk of complications like breast abscess. Parents should be educated about misconceptions and cultural practices like neonatal breast massage, so that these practices should be discouraged to avoid unnecessary harm to neonate. From our study, we observe that neonatal mastitis responds to intravenous antibiotics together with surgical intervention results in resolution of symptoms and neonatal mastitis.

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