

Neonatal purpura fulminans: A case series

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Abstract

Neonatal purpura fulminans is a rare, life threatening condition caused by congenital or acquired deficiency of protein C or S with clinical manifestations of dermal microvascular thrombosis, perivascular hemorrhage, disseminated intravascular coagulation (DIC) and hemorrhagic skin necrosis in neonates. We present here cases of neonatal purpura fulminans who had extensive purpuric rashes, DIC and low protein C levels.

Key words: Neonatal Purpura fulminans, DIC, Protein C Levels.

Introduction

In 1962, Purpura fulminans was first described in neonate, where etiology was presumed to be an inherited disorder. In 1983 it was found to have a clinical correlation to homozygous protein C deficiency.

Etiology includes congenital/inherited homozygous protein C and S deficiency, acquired causes may be due to decrease in production of homozygous Protein C like - Galactosemia, severe hepatic dysfunction, severe congenital heart disease and warfarin therapy or increase in consumption in conditions like -infections (Group B Streptococcus), DIC, acute venous thrombosis, acute phospholipid antibodies, cardiac bypass^[1]. Acute infectious purpura fulminans, is the most common form of purpura fulminans. The species commonly causing acute infectious purpura fulminans are Streptococcus pneumoniae, Group A and B streptococci, Staphylococcus aureus, Neisseria meningitidis^[2]. 60%–70% cases of purpura fulminans have been reported among children below 2 years of age. Here we, present a series of cases of neonatal purpura fulminans, reported at our centre:

Case report

Case no.1

We present a 28 days old female baby born out of non consanguineous marriage, to a primigravida mother, through NVD with birth weight of 2.5kg. Immediate postnatal period was uneventful. Baby presented with history of fever since 4 days and skin rashes, irritability, hurried breathing since one day with insignificant family history and antenatal history.

On admission baby had prolonged CRT (5sec), tachycardia (220bpm), tachypnea (68cpm) with fever

(101.3°F) and was lethargic. On examination, skin lesions (Figure1) seen at upper limbs, lower limbs and back were initially dark red and then changed to purple black, gradually became necrotic and gangrenous in next 48 hours.

Laboratory investigations - complete blood count (CBC) showed leucocytosis (35600cells/cumm) with thrombocytopenia (99000/cumm) with high CRP(80mg/l) with peripheral smear showing thrombocytopenia. Electrolytes - hyponatremia (sodium 120), hyperkalemia (potassium-7.2), prolonged prothrombin time (PT-52.6sec), activated partial thromboplastin time (48.6 sec), INR-6.7 and decreased protein C levels-20.31% (Normal:65-140%). Blood culture showed Klebsiella pneumoniae. Arterial Doppler ultrasonogram was suggestive of Popliteal artery thrombosis (Figure 2).



Figure 1. Extensive Purpura Fulminans on back and upper limbs

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Child was on ventilator support for 7 days. Other supportive treatment was given. FFP was transfused every 12th hourly daily. Low molecular weight heparin (LMWH) was given daily. Culture sensitive antibiotics were given for 14 days. Eventually, child was discharged against medical advice after 17 days of admission and died after 2 weeks of discharge.



Figure 2. Gangrenous lesion secondary to popliteal artery thrombosis

CASE NO.2

A 16 days old female baby born out of non consanguineous marriage to a P2L1D1 mother, through NVD with birth weight 2.75kg. Immediate postnatal period was uneventful. Baby presented with history of fever, hurried breathing since 2 days with h/o sibling death at 14 days of age and insignificant antenatal history. On examination, baby had skin rashes all over body since 2 days (Figure 3). Laboratory investigations- complete blood count (CBC) showed leucopenia (6100 cells/cumm) with thrombocytopenia (28000/cumm) with high CRP (76mg/l) and peripheral smear showing thrombocytopenia. Electrolytes- Hyponatraemia (sodium-130mEq/L), prolonged prothrombin time (PT-85.6sec), activated partial thromboplastin time (aPTT-79.5sec), INR-8.1 and decreased protein C levels-20.57% (Normal:65-140%). Blood culture showed *Enterobacter Aerogenes*. Child was on ventilator support. FFP was transfused every 12th hourly daily. LMWH was given daily. Other supportive treatment was given. Baby persisted to have DIC and Sepsis. Despite adequate treatment baby died on 4th day of admission.



Figure 3. Gangrenous lesions of digits

Table 1. Investigations of the cases

Investigation	Case no.1	Case no.2
Haemoglobin	13.6 g/dl	12.5 g/dl
Total leucocyte count	35000 cells/cumm	6100 cells/cumm
Platelets	99000 cells/cumm	28000 cells/cumm
Na ⁺ , k ⁺ , cl ⁻ (meq/l)	120, 7.2, 108	130, 3.6, 106
S. creatinine	1.2 mg/dl	1.4 mg/dl
S. calcium	8.2 mg/dl	7.0 mg/dl
CRP	80 mg/l	76 mg/l
PT, APTT, INR (seconds)	52.6, 48.6, 6.7	85.6, 79.5, 8.1
Blood culture	<i>Klebsiella pneumoniae</i>	<i>Enterobacter aerogenes</i>
Protein C (normal: 65-140%)	20.31%	20.57%

Discussion

Purpura fulminans is a life-threatening disorder characterized by sudden progressive cutaneous hemorrhage and necrosis. The three forms of this disease are classified by the triggering mechanisms:

- Neonatal purpura fulminans
- Idiopathic purpura fulminans.
- Acute infectious purpura fulminans.

Neonatal purpura fulminans generally presents within the first 72 h after birth. Protein C mutations, inherited deficiency of protein S or antithrombin III may lead to neonatal PF.

Idiopathic purpura fulminans follows a bacterial or viral illness and usually begins 7–10 days after the onset of the infection. Most cases occur in children. The pathogenesis involves acute transient decreases in protein C, protein S or antithrombin III levels^[3].

It has been well-described in the literature that sepsis and liver dysfunction can trigger procoagulants and

promote endothelial injury leading to consumption of clotting factors, impaired synthesis or both. In addition, in the neonatal population, newborns have physiologically immature clotting pathways and low plasma Protein C activity and antigen until 6 months of age.

PF (Purpura fulminans) in the setting of group B Streptococcal and gram negative sepsis has been reported in neonates, while *Neisseria meningitidis* and *Varicella* have been culprits in the older pediatric age group.

In the above two cases, neonatal purpura fulminans was assumed as acute infectious purpura fulminans as child presented with rapidly progressive skin lesions all over the body with late onset of sepsis and shock. In our patients blood cultures were positive, protein C (20% & 21%) was very low (Normal: 65–140%) and Protein S was normal.

Referring to management of our patients, FFP was transfused to correct the deficiency protein C. Unfortunately, concentrated protein C was not available in our hospital.

Children with severe heritable PC (protein C) deficiency have a life-long risk of PF and thus require long-term antithrombotic therapy with PC replacement and/or anticoagulants. Liver transplantation offers long-term cure by restoring PC levels but commits the patients to immunosuppressive therapy and confers the risk of formation of autoantibodies against foreign PC^[4].

Family screening is mandatory for early recognition which is lacking as PC genotyping is unavailable and if protein C concentrate is made widely available there is a scope in improvement of definitive management of this disease.

There is a necessity of multidisciplinary approach for better management of this fatal disease^[5].

References

1. Price VE, Ledingham DL, Krümpel A, Chan AK. *Diagnosis and management of neonatal purpura fulminans. Semin Fetal Neonatal Med.* 2011 Dec;16(6):318-22.
2. Choudhary S, Dhande S, Aghi T, Mahajan P. *Neonatal purpura fulminans caused by rare citrobacter species. Indian J Paediatr Dermatol.* 2018;19:164-6
3. Talwar A, Kumar S, Gopal MG, Nandini AS. *Spectrum of purpura fulminans: report of three classical prototypes and review of management strategies. Indian J Dermatol Venereol Leprol.* 2012 Mar-Apr;78(2):228.
4. Findley T, Patel M, Chapman J, Brown D, Duncan AF. *Acquired Versus Congenital Neonatal Purpura Fulminans. Journal of Pediatric Hematology/Oncology.* 2018 Nov;40(8):625-7.
5. Jafarri SA, Al Attas KM, Bajawi SM, Ahsan MK, Al-Sheikh AM, Buraik MA, et al. *Neonatal purpura fulminans in newborn with severe congenital protein C deficiency: Case report. Journal of Dermatology and Dermatologic Surgery.* 2017 Jul;21(2):104-6.

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