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Case Report

Snake bite of a surrogate woman: A social dilemma

Anjana Annal[1],*, Shameema Anvar Sadath[1], Stary Thomas[1]

[1] *Dept. of Obstetrics and Gynecology, Aster Medicity, Kochi, Kerala, India*

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ABSTRACT

India has one of the highest number of snakebites in the world with annual mortality rate of 2.4 per 100, 000 due to severe envenomation. However, the incidence of snake bite in pregnancy is rare. Diagnosis and management of snake bite in pregnancy poses challenges to an obstetrician due to its rarity. This case report presents such a scenario of a snake bite in a surrogate mother with twin pregnancy at 32 weeks with premature rupture of membranes complicated by coagulopathy. The surrogacy added to the complexity of the case. This case report addresses the early detection and multidisciplinary management of the above case preventing grave consequences for fetus and mother.

1. Introduction

The incidence of snake bite in Asia is estimated to be up to 4 million per year of which around 2 million are envenomed and 100,000 die each year. In India, which has one of the highest number of snakebites in the world, states like Maharashtra has annual mortality rate of 2.4 per 100, 000 due to severe envenomation.[1] However, the incidence of snake bite in pregnancy is rare. But if it occurs it has potential to cause grave complications to fetus and mother depending on the degree of envenomation.

In this case report, we are discussing a rare scenario of a snake bite in a surrogate mother with twin pregnancy at 32weeks with premature rupture of membranes.

2. Case Presentation

A 28-year old gravid 2 para 1 living 1, was a surrogate mother carrying diamniotic dichorionic twin pregnancy at 32 weeks and 2 days. She presented to casuality with alleged history of snake bite over left dorsum of foot on her way to hospital for history of leaking per vaginum which started 30 minutes before the snake bite. She did not recognise the type of snake. On examination the patient was conscious, oriented with stable vital signs. There was erythema along with fang mark over the left dorsum of the foot. Abdominal examination revealed 36 weeks sized irritable uterus. Both fetal heart rates were regular. On per speculum examination patient was confirmed to have clear leaking per vaginum with parous looking os. Systemic examination including her neurological examination was normal. Twenty minutes whole blood clotting test (WBCT) was done twice bedside and the blood was incoagulable. Patient was seen by multidisciplinary team including physician, obstetrician and intensivist.

Other laboratory investigations revealed Haemoglobin 13.4 g/dl, total leucocyte count 17.5 K/ul, platelet count 307 K/ul, APTT was 43.4seconds which was elevated, INR 1.08. Liver and renal function tests were normal. She was admitted in Intensive Care Unit and treated with 15 vials of polyvalent anti-snake venom (ASV) and antibiotics. Meanwhile steroid for pulmonary maturity along with nifedipine tocolysis was also initiated. Our plan was to medically stabilise the patient and manage conservatively with tocolysis and steroids. She was on continuous fetal heart monitoring. Within three hours of admission, the patient went into active labour. Multidisciplinary team

* *Corresponding author*.
E-mail address: anjuchennai@gmail.com (A. Annal).

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meeting along with patients relatives was called to address the risks associated with the caesarean section in the setting of deranged coagulation. The repeat whole blood clotting time after ASV administration was 12 minutes which was normal. Blood and blood products were reserved and she underwent an Emergency caesarean section. Intraoperative period was uneventful. Both babies cried immediately after delivery and was shifted to neonatal intensive care unit for monitoring and later handed over to the biological parents. Post operatively the patient's haemoglobin was found to be 7.2gm/dl for which she received one unit of packed cell. Patient developed spiking fever on post-operative day-2. She was diagnosed and treated for urinary tract infection with intravenous antibiotics. Patient was discharged on post-operative day 5.

3. Discussion

India has one of the highest snake bite mortality globally. World Health Organisation estimated incidence of snake bite to be 83,000 per year with 11,000 deaths.[1] Out of 236 species of snakes found in India, only 13 known species are identified to be poisonous. Of these, 4 species, namely Cobra, Russell's viper, saw scaled viper and common krait, are responsible for most of the venomous bites.

Snake bite in pregnancy is very rare. A study shows maternal death rate and fetal death rate in case of envenomation to be 4.2% and 43-53% respectively.[2] The determining factors that affect the clinical condition of the patient are species of the snake, age and weight of the victim, location and depth of the bite, quantity of venom injected and the time gap between the snake bite and treatment.

The venom of Cobra and Krait species are predominantly neurotoxic and cardiotoxic whereas the viper venom is haemotoxic and has necrotizing local effects.

The haemotoxic effect of the snake venom are due to different compounds such as procoagulant enzymes responsible for depleting the body's clotting factor eventually leading to consumption coagulopathy. Also it contains metalloproteinase which is responsible for damage of blood vessel endothelial lining causing local and systemic haemorrhage. The neurotoxic effect of the snake venom are due to enzymes that cause blockage of neuromuscular transmission which can result in ptosis, respiratory muscle paralysis and other neurological complications.

In our case, the patient had prolonged whole blood clotting time indicating that it was a haemotoxic snake.

3.1. Effect of snake bite on pregnancy

The venom of snake bite can cause hemolysis, coagulopathy, obstructive haemorrhage, hypotension, hypovolemic shock and anemia in mother. Fetal complications include miscarriage, prematurity, neonatal jaundice and sepsis. A study reported abruption and fetal loss which might have been due to hemorrhage into placenta. Other mechanisms explaining fetal death includes fetal anoxia due to maternal shock, direct effect of envenomation on fetus, premature uterine contractions caused by the venom, acute fetal anemia, supine hypotension syndrome, fever due to cytokine release and tissue damage in mother and anaphylactic reaction to antivenom.

In our case, we are not sure whether the snake venom as such precipitated the labour or whether she went into labour as a result of premature rupture of membranes. As the patient went into labour, the decision making for delivering the patient was easy, thus avoiding the maternal and fetal complications associated with snake bite while conservatively managing preterm premature rupture of membranes. Also we did not have any adverse fetal effects probably due to the immediate care she received.

Snake bites in first trimester can cause fetal malformations. Zugaib et al reported a case in which a pregnant woman in her 16^{th} week was bit by Russell viper and delivered a baby with hydrocephalus and polydactyl.[3] Another study reported a case where multiple anomalies with hydrocephalus were found in a baby whose mother was bit by a viper in her 12^{th} week of pregnancy.[4] Mechanisms proposed to explain fetal anomalies include possibility of snake venoms to have embryotoxic and teratogenic effects.

4. Clinical Features

The essential signs of snake bite are fang mark over the bitten area, local pain, edema and erythema.[5] Other symptoms may include nausea, vomiting, generalized weakness, oral and lingual tingling sensation, numbness, giddiness, tachycardia, hematemesis, hematuria and fasciculations. The local edema can extend to involve the whole limb in severe cases. Laryngeal edema or respiratory muscle paralysis may lead to respiratory arrest.

4.1. Investigations

20 minute Whole Blood Clotting Test is a reliable bedside test done for diagnosing clotting capability of the patient. The test should be repeated every 30 minutes from admission for 3 hours and then hourly till patient is stable. Other tests to be done are complete blood count (CBC), prothrombin time (PT), activated partial thromboplastin time (APTT), fibrin degradation products (FDP)/D-dimer. Urine routine examination should be done for hemoglobinuria, myoglobinuria and proteinuria. Renal function tests, oxygen saturation, arterial blood gas analysis are other useful tests in management of snake bite envenomation.

4.2. Management of snake envenomation during pregnancy

Initial first aid includes expediting transfer to medical centre, keeping the patient warm and at rest, keeping the injured part of body immobilised in a functional position. Pregnant women can preferably be placed in left lateral decubitus position. Even though tourniquets are not recommended, many patients reach hospital with tight tourniquets. Careful precautions should be taken while removing this tourniquet as sudden removal can lead to release and surge of toxins. Before removal of the tourniquet, distal pulse has to be checked. If the distal pulse is not palpable, blood pressure cuff should be applied and inflated following which the pressure should be gradually reduced.

Anti snake venom (ASV) is the mainstay treatment in case of envenomation. The polyvalent ASV available in India is effective against all four common poisonous species of snakes. ASV is available in liquid and lyophillised forms. There is no evidence to support that one form is more effective than the other. ASV should be administered only when signs of envenomation such as coagulopathy or neurotoxicity is present. Since ASV carries a risk of anaphylactic reaction, prophylactic hydrocortisone (100mg) or antihistamine is to be given. The fetal death rate is reported to be around 55-58% in patients receiving antivenom.[6] Even though the safety of antivenom in pregnancy is unclear, the risk of withholding outweighs the risk of administration in case of envenomation. In our case counselling regarding anti snake venom was a difficult one because of social issues concerning surrogacy.

Each ml of antiserum can neutralize 0.6 mg of cobra and Russell viper venom and 0.45 mg of common krait and saw scaled viper venom.[7,8] Each vial contains 10 ml of reconstituted ASV and the initial dose includes administration of 8-10 vials. It can be administered as iv infusion 5-10 ml/kg body weight or as slow intravenous injection (2 ml/min). Further doses will depend on response to the initial dose. Local administration of ASV around the bite area is not recommended. After initial dose of ASV, the clotting test should be performed after 6 hours to check for the replenishment of the clotting factors. If clotting test is positive, repeat doses of 5-10 vials should be given 6 hourly till coagulation is restored.[7]

In case of neurotoxic envenomation, patient should be reassessed after one or two hours of initial dose and second dose should be considered if required. The venom of Cobra contains post synaptic neurotoxin and the venom of Krait and Russell viper contains presynaptic neurotoxin. Neostigmine is an anticholinesterase drug which is effective against the former and is administered as 0.5-2 mg IV and continued half hourly over 8 hours if improvement occurs. It is a category C drug and can cause preterm labour but potential benefit may warrant its use despite its risk.[9]

5. Conclusion

Snake bite in pregnancy is very rare but if it occurs, the management is challenging as both the lives of mother and fetus are in danger. Timely diagnosis and prompt treatment with antivenom antiserum is life saving. We report this case due to the rarity and because of complexity involved due to prematurity, preterm rupture of membranes along with social issues of surrogacy.

6. Source of Funding

None.

7. Conflict of Interest

None.

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Author biography

Anjana Annal Specialist

Shameema Anvar Sadath Consultant

Stary Thomas Specialist

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