CASE STUDY

FATAL NEONATAL TETANUS
FROM RURAL BANGLADESH

Madeline Fitzpatrick
Abstract

Introduction

Tetanus is a life-threatening disease caused by Clostridium tetani. It is a particularly dangerous and potentially fatal disease when contracted by neonates. Bangladesh has been declared free of neonatal tetanus. However, despite this status, isolated cases do still occur. This case describes the challenges faced by the Bangladeshi health system in combating this illness.

Case Report

Patient B was seen during a hospital ward round in rural Bangladesh with his mother, who had noted irritability and rigidity in his limbs from day 3 of life. He was no longer able to feed normally and had markedly decreased oral intake. On examination, he exhibited profound hypertonia and hyperreflexia of all 4 limbs, opisthotonos, and scissoring of the legs. His management in hospital was primarily supportive and he died at 9 days of age.

Conclusion

Vaccination with tetanus toxoid in women of reproductive age has vastly improved the incidence of neonatal tetanus across Bangladesh. Despite this improvement, cases do still occur and may result in poor outcomes. This case study identifies 2 contributing problems: firstly, access to public health services in rural areas and, secondly, a paucity of appropriate resources in hospitals servicing these areas.

Introduction

An Australian research team, comprised of 2 neonatal nurses, 1 paediatrician, 1 general practitioner, a public health professional and, 11 fourth-year medical students from Western Sydney University visited hospitals in rural Bangladesh in the context of a paediatrics research expedition.

The trip was designed as a 12-day field survey in the regional towns of northern Bangladesh. Three thousand children under the age of 12 and their mothers were examined and interviewed. Throughout this research expedition, the group was given the opportunity to attend ward rounds in various hospitals around Bangladesh. Cases of diphtheria, tetanus, measles, untreated thalassemia with profound clinical signs, and many cases of bronchopneumonia were diagnosed in these paediatric patients. Doctors and nurses in Bangladesh are faced with a resource-poor health system and a population with overwhelming medical care needs. Despite these challenges, they endeavour to provide high-quality medical care.

Discussion

Pathophysiology

Tetanus was once considered a terrifying illness throughout the world. The gram positive, anaerobic bacterium Clostridium tetani produces a toxin (i.e., tetanospasmin) which causes profound muscle spasms and autonomic dysfunction via inhibition of GABA and glycine release at the spinal cord. [1,2] The resulting loss of inhibitory signals for motor neurons results in the characteristic rigid paralysis of tetanus. In neonatal cases, such as the one described, the bacterium is typically introduced via the umbilical cord, where it then multiplies and releases the toxin.[3] The disease course of fatal neonatal tetanus usually culminates in respiratory arrest, when severe muscle rigidity prevents normal
respiration.

Management

Treatment protocols include antibiotic therapy to eradicate any remaining Clostridium tetani bacteria and the administration of tetanus antitoxin.[2] The late detection of the illness often means that large amounts of the toxin have already reached nerve terminals, reducing the efficacy of its antitoxin.[2] Benzodiazepines may be used to acutely relieve muscle spasms and rigidity. Magnesium may also be used to combat autonomic dysfunction.[2] As the disease progresses, intubation is essential for respiratory support.[4] These treatments, amongst other options, all rely on ICU-level nursing, medical care and facilities.[4]

Tetanus in Bangladesh

Thanks to immunisation and improved public health awareness, disease rates of tetanus remain low in high-income countries.[5] In low- and middle-income countries, tetanus is still a common disease. Despite this, many countries have successfully eliminated tetanus, including several countries across Africa and Asia.[1] Bangladesh is one such country declared by UNICEF to have eliminated neonatal tetanus; this has been attributed to an aggressive and successful public vaccination program.[6] “Eliminated” is defined as less than one case for every 1000 live births in the country.[3] Yet, tetanus is a pervasive disease due to its presence in the soil of every country in the world, meaning that herd immunity is unreliable and cases such as the one described still occur.[3]

Public health measures

In Bangladesh, the most common venue for a woman to give birth is at home, with rates estimated at 81.7%, according to national data.[10] Patient B’s mother delivered at home and was not attended by skilled medical help, meaning that the umbilical cord was likely cut without sterile instruments. Improving maternal education and birth hygiene is a key element in further reducing tetanus rates in countries such as Bangladesh.[3]

Further, uptake of community health services during the antenatal, perinatal, and postnatal periods is essential to ensure early detection of any problems with a new baby. These services exist across Bangladesh, but a major access barrier is a lack of community awareness regarding these services.[12] A 2017 cross-sectional study determined that only one-third of women of reproductive age in Bangladesh were aware of the clinics available to them.[12] The authors identified a need for public health education measures to increase attendance at these health services.[12] Increased understanding amongst rural communities will hopefully improve vaccination, disease prevention, birth education and health literacy amongst families.

Management of tetanus in regional Bangladesh

Tetanus is still seen in high-income countries, albeit rarely.[1] As previously discussed, the effective management of neonatal tetanus requires ventilatory support and ICU facilities. In Bangladesh, the first part of the tetanus puzzle (i.e., vaccination and education) has been partially solved. The second
part of the equation – adequate facilities to treat cases of tetanus – requires further development. The management of Patient B may have been very different if his treating team were able to utilise ICU-level facilities, including ventilatory support. Until healthcare professionals in this setting are properly resourced, cases such as these will inevitably occur.

Madeleine is a final year medical student at Western Sydney University. She is not great with geography and often finds herself getting lost, so she likes to travel to distant places where getting lost is a tad more socially acceptable.

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Conflict of interest

None declared

Correspondence

18428399@student.westernsydney.edu.au

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