Parental Refusal to Diphtheria Vaccine: A Fatal Outcome

Syafinaz Amin Nordin, MBChB, MPath*, Faridah Idris, MPath*, Rukman Awang Hamat, MPath*, Fathinul Fikri Ahmad Saad, MMed (Radiology)*, Malina Osman, MComm Health*, Fadzillah Ghazali, MMed (Paeds), Ilina Isahak, MBBS, MSc, AM*****

*Faculty of Medicine & Health Sciences, Universiti Putra Malaysia, Serdang, Selangor, Malaysia.
**DEMC Specialist Hospital, Shah Alam, Selangor, Malaysia
***Faculty of Medicine & Health Sciences, Universiti Sains Islam Malaysia, Kuala Lumpur, Malaysia

SUMMARY

We present a case of a four-year-old boy who succumbed to diphtheria following incomplete course of immunisation, which included diphtheria vaccine. This case report focuses on the issues of parental refusal to vaccines and the development of "halal" vaccines for the prevention of infectious diseases.

KEY WORDS:
Diphtheria, "halal" vaccine , vaccine-preventable disease

INTRODUCTION

Diphtheria is an acute infection commonly affecting the upper respiratory tract. It is caused by the bacterium *Corynebacterium diphtheriae*, which mode of transmission is by the respiratory droplets from an infected person or an asymptomatic carrier to a susceptible person. Incidence of diphtheria has decreased following the introduction of diphtheria vaccine. In Malaysia, the immunisation schedule for diphtheria vaccine is at two, three and five months, followed by booster doses at 18 months and six years old. We present a case of a four-year-old boy who succumbed to diphtheria following incomplete course of immunisation, which included diphtheria vaccine.

CASE REPORT

A four-year-old boy presented to the Emergency Department at early morning hours in severe respiratory distress. Parents noticed he had noisy and difficulty breathing an hour before his condition got worse. He had two days of high grade fever associated with cough, runny nose and poor oral intake. Prior to the presentation, he had tonsillitis and was treated by a general practitioner. He remained active nonetheless. He was a healthy boy, with no history of asthma and allergy. Antenatal and postnatal history was uneventful. However, due to parental refusal to vaccines, his immunisation history was incomplete. It seemed that he was only vaccinated at birth. He was the sixth child of seven children. Parents had tertiary education and were more keen on alternative medicine and did not incline to have their children vaccinated because they doubted the safety and efficacy of vaccines, as well as their "halal" status. "Halal" is permissible according to Islamic law. It applies to food, drink and all matters of a Muslim's daily life.

On examination, he was in severe respiratory distress, with presence of stridor, grunting, tachypnoea, and severe intercostal recession. He was tachycardic with heart rates of 170-190 beats per minute. On auscultation, bilateral crepitations and rhonchi were present with poor breath sounds. In view of respiratory distress, intubation was warranted and upon intubation, severe exudative and membranous tonsillitis with inflamed laryngopharynx was noted with presence of thick secretion. Scraping of the adherent membrane resulted in bleeding. The intubation process was difficult and only a small endotracheal tube (size 4.5) was able to be inserted.

Clinical impression was consistent with diphtheria and the management plan included ventilatory support, administration of crystalline penicillin and diphtheria antitoxin. While he was managed in the intensive care unit, the endotracheal tubes had to be changed a few times due to blockage. There was also contact bleeding around tonsils and oropharynx.

Laboratory investigation showed progressive leucocytosis with neutrophilia. Other laboratory findings included hypokalaemia (2.9 mmol/L), increased serum creatinine (0.60 mmol/L), and elevated liver enzymes (ALT 34 IU/L and AST 43 IU/L). Erythrocyte sedimentation rate was 100 mm/hr (normal < 15 mm/hr). Screening for infectious mononucleosis screen was negative. Culture and sensitivity tests from blood, tracheal aspirate and pleural fluid did not isolate any microorganism.

Serial chest X-rays were consistent with pneumonic changes that worsened with progression to respiratory distress syndrome (Figure 1)

He developed septicemia requiring inotropic support. In spite of active management, his condition deteriorated and he passed away on day 3 of admission.

DISCUSSION

Diphtheria is caused by *Corynebacterium diphtheriae*, a gram-positive bacillus which is transmitted by respiratory droplets. Patient's presentation is consistent with features of diphtheria [1]. Diagnosis is confirmed by isolation of the organism from respiratory secretions or detection of diphtherial toxin [1]. In our case the *Corynebacterium diphtheriae* was not isolated from

This article was accepted: 8 May 2013
Corresponding Author: Syafinaz Amin Nordin, Faculty of Medicine & Health Sciences, Universiti Putra Malaysia, Serdang, Selangor, Malaysia
Email: syafinaz@upm.edu.my

Fig. 1a : Chest radiograph (AP supine) showing parahilar haziness remarkably on the right side suggesting alveolar consolidative changes.

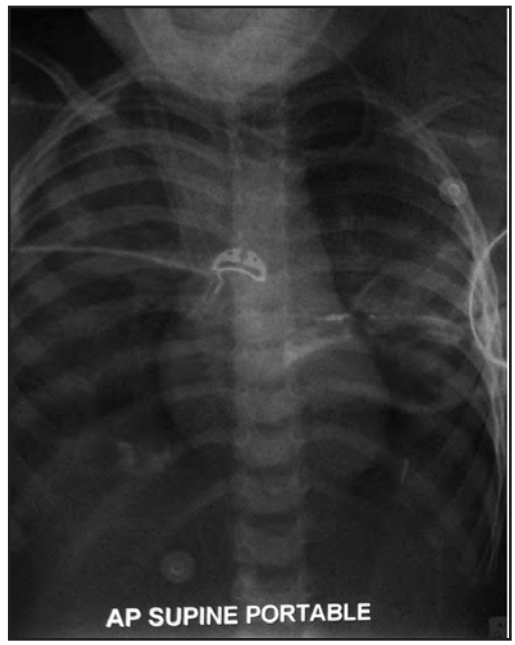

Fig. 1b : A follow-up chest radiograph(AP supine) showing progression of the consolidative changes into both lung fields (R>L) .

the clinical samples. This organism requires a special culture media to grow and laboratory notification would always be helpful to ensure isolation of the organism.

Diphtheria is endemic in many parts of the developing world but the incidence has reduced following DTP immunisation in childhood. Where diphtheria is endemic, 3% to 5% of healthy individuals may carry the organism in their throats and immunisation reduces colonisation by the organism [1]. The DTP vaccine coverage since the year of 2000 has been more than 90% on average and reported cases of diphtheria was four, zero and three cases in years 2008, 2009 and 2010 respectively [2]. Not all parents are inclined to have their children vaccinated. It has been reported that reasons why parents refuse to have their children vaccinated included religion and traditional beliefs against vaccines[3] where they doubt the "halal" status of the content. Parents in this case preferred alternative medicine which is in accordance with Zuzak *et al.* who reported lower vaccination rates among complementary and alternative medicine users, in comparison to their counterparts [4]. There were also lack of knowledge about the threat of the infectious diseases, uncertainty about the effectiveness of immunisation and parental concerns that vaccines actually do more harm than benefit to their children [3]. Interestingly, Smith *et al.* noted that children who were not vaccinated had parents with higher education qualifications and income in comparison to those children who had complete vaccination [5]. These parents had concerns regarding safety of vaccines. This finding reflects our case, he only had vaccination at birth with BCG and first dose of hepatitis B vaccines. This is further complicated by reports associating certain conditions for examples, infertility and autism, with administration of vaccines,[3] although the validity of these findings have been questioned and refuted.

The public, especially parents need to be explained and reassured about the efficacy and importance of vaccines in reducing the morbidity of, if not preventing, infectious diseases. The World Health Organisation has actively advocating and promoting immunisation to control vaccine-preventable diseases, including diphtheria. Where the "halal" status is concerned, in view that Malaysia has now become the global hub for "halal" products, efforts for research and the development of "halal" vaccines should be made a priority, this is even more so in view that the Muslims population around the world was estimated at 1.6 billion in 2010.

CONCLUSIONS

This case report illustrates a fatal outcome of diphtheria, which is a vaccine-preventable disease. In Malaysia, DTP coverage rate has been more than 90% and a few reported cases of diphtheria have been reported. Parental refusal to vaccines include traditional and religious beliefs as well as safety issues, therefore, explanation and reassurance are important to ensure compliance to immunization schedule. In view that Malaysia is now becoming the global hub for "halal" products, efforts for research and the development of "halal" vaccines should be made a priority.

REFERENCES

1. Roy RM. *Corynebacterium diphtheriae*. In: Mandell GL, Bennett JE, Dolin R (eds). Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. Philadelphia:Churchill-Livingstone, 2010: 2695-701.
2. World Health Organization. Immunization profile-Malaysia. Available at: http://apps.who.int/immunization_monitoring/en/globalsummary/countryprofileresult.cfm?C=mys (accessed on April 27, 2012)
3. World Health Organization.(2009). Epidemiology of the unimmunized child. Available at: http://www.who.int/immunization/sage/CDC_UNVACC_REPORT_FINAL_v2.pdf (accessed on July 27, 2012)
4. Zuzak TJ, Zuzak-Siegrist I, Rist L, *et al.* Attitudes towards vaccination: users of complementary and alternative medicine versus non-users. Swiss Medical Weekly. 2008.138(47-48): 713-8.
5. Smith PJ, Chu SY, Barker LE. Children who have received no vaccines : who are they and where do they live. Pediatrics.2004.114: 187-95.