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Ascaris lumbricoides infestation and Upper Airway Obstruction Necessitating Tracheostomy

Jasper Abiodun Oyinpreye¹, Okolugbo Nekou²

¹Department of Anaesthesia, College of Health Sciences, Delta State University, Abraka Delta State, Nigeria

²Department of Surgery, College of Health Sciences, Delta State University, Abraka Delta State, Nigeria

Email address

aojasper@yahoo.com (J. A. Oyinpreye)

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Abstract

Ascaris lumbricoides, an intestinal roundworm, is one of the most common helminthic human infections worldwide. Highest prevalence occurs in tropical and subtropical regions, and areas with inadequate sanitation. Ascariasis occurs in rural areas of the southeastern United States. When, the adult worms move in a reverse direction towards the pharynx, and emerge from the mouth or nose or enter the Eustachian tube or even the nasopharyngeal duct where they can be a cause of upper airway obstruction. This wandering habit of the can have severe, life threatening consequences if they enter the trachea. There are only a handful of cases in the literature where children or adults with altered sensorium developed fatal respiratory obstruction due to Ascaris. This patient being presented came with upper airway obstruction of sudden onset from Ascaris and had emergency tracheostomy.

1. Introduction

Ascaris lumbricoides is a helminthic infestation with some prevalence in Africa, Asia and the Latin America. Its prevalence, especially in the farming population and areas with poor sanitation is well known. Its effects are also predominantly seen in children as a cause of anemia and malnutrition in our environment.¹ Although ascariasis occurs at all ages, it is most common in children 2 to 10 years old, and prevalence decreases over the age of 15 years. Infections tend to cluster in families, and worm burden correlates with the number of people living in a home².

Through its various manifestations upper air obstruction is not a common feature though there have been a few incidents described in literature.^{3,4} This is the case of a 3 year old child presenting at the children emergency in extremis with upper respiratory tract obstruction, necessitating an urgent tracheostomy and was transferred to a general intensive care unit.

2. Case Presentation

A 3yr old girl was brought into the Accident and Emergency unit with a history of foreign body aspiration at about 1:00am. It was of sudden onset, and mother was not aware of the object involved. There was no history of vomiting.

The child was in severe respiratory distress with flaring of alae nasi, intercostal

recession, chest and abdominal wall retraction on inspiration. Her respiratory rate was 40 breaths per minute: while there was associated inspiratory rhonchus.

The breathing progressed to gasping breaths as the child was being transferred to the operating room despite the administration of oxygen by nasal prongs. Blood pressure was not taken; oxygen saturation (SpO₂) on admission was 80-85%. Face mask applied to face and oxygen saturation increased up to 90%. Laryngoscopy was negative for a foreign body neither did suctioning of secretions improve her status. We proceeded immediately for an urgent tracheostomy as the airway obstruction persisted. Anaesthesia was local infiltration with 4mls of 1% plain lignocaine at site of surgery and 100% oxygen by face mask.

After successful percutaneous intubation with a 4mm endotracheal tube in the absence of an appropriate size tracheostomy tube, chest expansion became better and saturation rose to 100%. Procedure lasted twenty minutes. Within 5 minutes of tracheostomy an adult *Ascaris* was seen coming out of the patient's mouth. A repeat direct laryngoscopy under inhalational halothane was also negative after the passage of the ascaris worm. X-ray could not be done. Child was sent to the intensive Care Unit (ICU) for continuous evaluation on the supplementary O₂ through an Ayres T-piece breathing circuit. In the intensive care unit patient condition deteriorated over the next 24 hours despite supplemental oxygen, after which he had a cardiac arrest from which resuscitation proved abortive.

3. Discussion

Ascaris lumbricoides is a parasitic Nematode (roundworms) of the human gastrointestinal tract, globally distributed in tropical and temperate regions. Studies show that that 1.3 billion people are infected with ascaris worldwide⁵. This Infestation by *Ascaris lumbricoides* is still endemic in various part of the world with estimates around 12 million cases per year with approximately 10,000 deaths globally⁶. Population at risk for this infestation is those who stayed in areas with sub-optimal sanitation, practiced poor personal hygiene, and have a poor educational background. *Ascaris lumbricoides* is transmitted through ingestion of agricultural products or food contaminated with the parasite eggs⁷

The precipitous loss of an airway in a child is alarming, no matter what the setting. In the community setting, causes include croup, tracheitis, epiglottitis, retropharyngeal abscess, congenital structural defects, foreign bodies, by food particles, toys and traumatic causes (including burns) and uncommonly by ascaris worms⁸

The presentation of this child in severe upper respiratory distress was an indication for an emergency tracheostomy. Tracheostomy is an artificial opening made into the anterior wall of the trachea which communicates with the outside air. One of the major indications for tracheostomy is upper airway obstruction as seen in this patient, preferably tracheostomy is done after endotracheal intubation and after

the trachea has been exposed and an appropriate sized tube inserted the endotracheal tube is gradually withdrawn and the tracheostomy tube inserted, however when there is a suspicion of foreign body aspiration as was in this case, the tracheostomy is best done under local anaesthesia as a foreign body in the upper airway will be pushed further down the airway whilst the patient is being intubated, in some circumstances after the tracheostomy is done while attempting to put in a tube the foreign body is visualised and removed subsequently. In other cases a direct laryngoscopy is performed afterwards. After successful tracheostomy child required supplemental oxygen. The extrusion of an ascaris worm confirmed the cause of the upper airway obstruction. In an earlier report the ascaris worm was seen migrating from the oesophagus⁹. It is also known that at no stage of the ascaris cycle does the worm inhabit the airway and lungs. When it happens it provokes such life-threatening responses as laryngeal spasm and other forms of airway obstruction. Fewer cases of significant airway obstruction have been cited. The cases reported have included one of an adult who developed marked stridor and cyanosis¹⁰. This patient was able to cough and spontaneously expectorate the 22-cm worm. Reported cases that have involved young children include the fatal case of a 13-month-old child who was admitted with severe dehydration and respiratory distress¹¹. The source of the obstruction was identified during post mortem examination. The degree of airway obstruction will depend on the size of the worm and the age of the child involved. This is due to the fact that younger children will have smaller caliber airway and thus have a higher tendency to have a complete obstruction which if not promptly managed will usually lead to a fatality, thus an index of suspicion will be helpful to the clinician also like wise smaller sized worms and immature worms would be less likely to lead to complete obstruction and are more likely to be coughed out than the adult sized worms causing total obstruction. Other Fatal cases due to adult ascaris in the lungs had also been reported^{12,13}.

There have been reported cases where the worms were pushed into the larynx during nasotracheal intubation in children but removed at fiberoptic bronchoscopy^{14, 15}. In this patient the passage of the tracheostomy tube and relief of obstruction improved oxygen saturation, saving the life of a dying girl

Removal of immotile worms from the small airways of young children can be technically challenging. The relatively small lumen of the endotracheal tube can also pose difficulties

Viable options for the removal of this worms include laryngoscopy and removal under direct vision by catheter suctioning at fiberoptic bronchoscopy. Where this fails emergent rigid bronchoscopy or removal through tracheostomy are known options. Availability of appropriate size tracheostomy tube in children will sometimes be a challenge and a readily viable alternative could be an appropriate size endotracheal tube which may sometimes be

cut to size length-wise to facilitate mechanical ventilation. Care of these tubes could sometimes be a challenge as regular suctioning with the appropriate size suction catheters and may require close supervision by senior medical personnel in the intensive care unit. Availability of paediatric mechanical ventilators for patients in this age group have also been found to always present a challenge, therefore breathing circuits with oxygen supplementation are ready alternatives. The risk of prolonged administration of 100% oxygen and respiratory distress syndrome that occurred in this patient further worsened an already precarious morbid state. Care of children in general intensive care unit may not be as expected in the absence of a paediatric medical and nursing staff who may be better skilled in the care of this patient.

4. Summary

Late presentation to hospital and sometimes inaccessibility to hospital facilities can make such potentially life-threatening conditions cause undue mortality in ascaris endemic communities. A high index of suspicion of *ascaris lumbricoides* though rare, being responsible for a sudden incidence of upper airway obstruction in a child is also necessary as seen in this case since this would go a long way in helping to institute appropriate management. Good hygiene and regular deworming programs go a long way in preventing such complications of easily treatable conditions and thus should be carried out extensively in all communities particularly the endemic areas. Availability of highly skilled personnel to care for pediatric airway obstruction patients in general intensive care unit could be a stop gap to the provision of pediatric intensive care unit to cater for the specific needs of this age group. However this may not be comparable to designated intensive care unit where specific and appropriate equipments and personnel are available.

Abbreviation

SpO₂ -Oxygen saturation
ICU -Intensive Care Unit

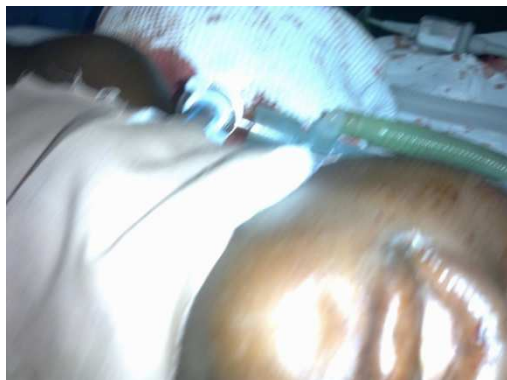


Figure 1. After tracheostomy.



Figure 2. Shows size 4.0mm non cuffed.



Figure 3. *Ascaris lumbricoides* coming out of patient's mouth after end of procedure.

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