

Anesthesia for Extraction of a Bronchial Foreign Body in a Three-Year-Old Child About a Case at the CHU Ignace Deen in Conakry

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Abstract: Introduction: Foreign body inhalation (FB) is a medical-surgical emergency and a frequent cause of respiratory distress in children. Multidisciplinary management combining ENT surgeon and anesthetist-resuscitator. Rigid or flexible bronchoscopy under general anesthesia in total or inhaled intravenous allows the diagnosis and the extraction of the foreign body. The rarity and seriousness of the inhalations seem to us to justify their publication. We report the journey of a case of inhalation of a foreign body consisting of a 6 centimeter point, the extraction of which was only possible thanks to a bronchoscope associated with a Quick air. Observation: this is a child of three in a particular ATCD from 132 km from the capital for inhalation of a foreign body for several days, after passing through two health structures for extraction without success for lack of a specialist. The child is admitted to the CHU Ignace Deen. The clinical, radiographic examination of the thorax revealed a rectilinear opacity of approximately 6 cm next to the right main bronchus. The indication for extraction under general anesthesia was raised. The first attempt at D12 inhalation with a rigid bronchoscope ended in failure. The second attempt two weeks later under inhalation anesthesia with halothane using a rigid bronchoscope associated with Quick air enabled the successful extraction of a tip of approximately 6cm. The immediate evolution was simple. Conclusion: the anesthesia of the child for inhalation of foreign body is a real challenge for the anesthesiologist-resuscitator. The choice of induction technique can be intravenous or inhalation with preservation of spontaneous ventilation. The rigid bronchoscope associated with the Quick air allowed the extraction.

Keywords: Foreign Body, Anesthesia, Rigid Bronchoscope, Quick Air

1. Introduction

Foreign body (FB) inhalation is a common cause of

respiratory distress in children. It can be responsible for an array of acute asphyxia, which can be the cause of death if extraction maneuvers are not quickly performed [1]. Any

suspicion of inhalation of tracheobronchial CE must imperatively lead to the performance of a tracheobronchial endoscopy in a specialized environment in order to confirm the diagnosis and allow its extraction [2]. This endoscopy performed under general anesthesia represents a real challenge for the anesthetist who must guarantee correct oxygenation and ventilation in a child with a mechanical obstruction of the airways, while maintaining a sufficient depth of anesthesia to prevent the occurrence of laryngospasm, bronchospasm or direct trauma secondary to endoscopic maneuvers. The rarity and seriousness of the inhalations seem to us to justify their publication. We report the journey of a case of inhalation of a foreign body consisting of a 6 centimeter point, the extraction of which was possible only with a bronchoscope associated with a Quick air.

2. Observation

This is a 3-year-old child without medical-surgical ATCD from the prefecture of Boffa located 132 km from the capital Conakry, initially referred to Fria hospital which located 77.3 km from Boffa at 1h38 min drive, for suspected inhalation of a tip during a playful game with his comrades, causing suffocation associated with a dry cough. A chest X-ray was performed and showed a rectilinear opacity of approximately 6 centimeters next to the right main bronchus (Figure 1).



Figure 1. Opacity on AP chest radiograph.



Figure 2. Chest CT showing a longilinear foreign body after a 60° rotation.

He is then transferred to the capital Conakry for specialized care. Initially, at the Sino-Guinean hospital where a 60-degree rotational thoracic CT scan revealed a slender 6-centimeter foreign body resembling a spike in the right main bronchus (Figure 2). He was subsequently sent to the CHU Ignace Deen. In the Oto-Rhino-Laryngology department, the initial clinical

examination revealed a very asthenic child, weighing 14 kilograms, very congested, dyspneic with beating of the wings of the nose and a pulsed oxygen saturation at 91% in air ambient, respiratory rate 34 cycles/minute, persistent expiratory wheezing, heart rate 154 beats/minute. The remainder of the examination was unremarkable. The diagnosis of right bronchial foreign body was made. Endoscopic extraction was recommended. The child previously benefited from a protocol consisting of methylprednisolone 30 mg/24 h and amoxicillin clavulanic acid 80 mg/24 h. The pre-anaesthetic consultation made it possible to evaluate the clinical respiratory state of the child, to reassure and inform the parents. The child is admitted to the operating room on D12 of the inhalation of the foreign body. The anesthesia technique chosen was intravenous general anesthesia with preservation of spontaneous ventilation. Induction was performed in the supine position with propofol 30 mg after optimal preoxygenation; the extraction attempt failed due to bronchial hypersecretion rendering the tip invisible, hemodynamic instability and desaturation. The extraction procedure was stopped, the patient intubated and awakened after stabilization. Two weeks later, i.e. 14 days after inhalation of the CE, the child was again admitted to the theater for a second attempt to extract the foreign body under inhalation anesthesia with halothane with maintenance of spontaneous ventilation. A rigid bronchoscope coupled to a Quick air (Figure 3) was used for this second procedure. The Quick air cable is introduced into the bronchoscope to visualize the EC first on the Quick air screen, then the Quick air cable is removed, the clamp is introduced into the bronchoscope and the tip has been entered for the first time. times, without being able to be reassembled. A second attempt was made as previously described with the Quick air which resulted in success with the ascent of a spike measuring 6 cm in length (Figure 4). During the extraction procedure, which lasted 90 minutes, the patient's peripheral oxygen saturation varied between 94 and 96%, while the systolic blood pressure oscillated between 100/60 and 110/60 mmHg.

The child was intubated after extraction of the foreign body and removal of the rigid bronchoscope to optimize oxygenation until full recovery after 20 minutes. The extubation was performed successfully and the immediate clinical evolution was satisfactory on the hemodynamic and respiratory level (Figure 5).



Figure 3. Quick Air device, curved blade and cable.



Figure 4. Foreign body after extraction.

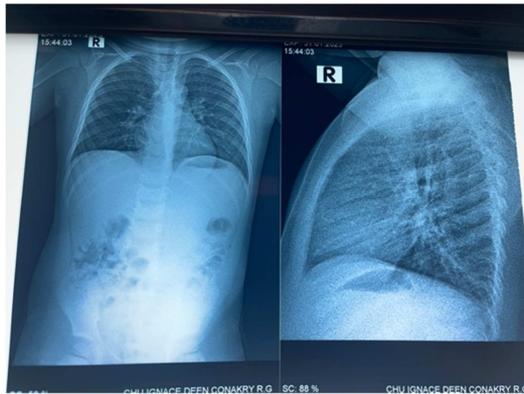


Figure 5. Frontal and lateral chest X-ray after removal of the foreign body.

3. Discussion

The accidental inhalation of a solid foreign body in the lower respiratory tract is a frequent domestic accident in children, especially in the age group of one to three years [3]. This is the case of our patient. 3 years old. In the event of bronchial enclavement diagnosed late, the foreign body can lead to complications and long-term respiratory sequelae. Hence the importance of early extraction of these foreign bodies [3].

Penetration syndrome is the key clinical feature for early diagnosis. Its presence should lead, as soon as possible, to the only gesture that is both diagnostic and therapeutic: bronchial endoscopy. Data from the clinical examination and the chest X-ray often help in the diagnosis, but may be completely normal in the face of authentic inhalations of tracheo-bronchial foreign bodies, especially in the first hours after the accident [3].

Rigid bronchoscopy under anesthesia remains the only examination that can confirm the diagnosis and extract the foreign body [4], as was the case in our patient. The glottis and the trachea are involved in less than 10% of cases, the right main bronchus in 47 to 87%, the left main bronchus in 0 to 40%, while the CEs are bilateral in 0 to 7.6% [5]. The predominance of the location in the right main bronchus is explained by anatomical reasons (bronchial angles with the tracheal axis of 30° on the right and 45° on the left, caliber slightly greater than the left main bronchus) [6]. Prolonging the stay of the EC in the bronchus will lead to a process of bronchial enclavement, the consequences of which are first ventilatory and then very quickly infectious [5]. This was the case in our patient before the specialized care two weeks after

the incident. A study by Zur KB et al had shown that in the presence of a full stomach, a rapid induction sequence should be performed [7], combining propofol (5 mg/kg), celocurine (1 to 2 mg/kg) and atropine (20 µg/kg). Therefore the Sellick maneuver is not recommended due to the potential risk of mobilization of a subglottic EC. The rapid passage of the bronchoscope is then possible by the ENT surgeon. However, some authors [8] recommend tracheal intubation and gastric emptying before passage of the rigid tube. Apart from the situation of a full stomach, total intravenous anesthesia with preservation of spontaneous ventilation has been used successfully by several authors [9, 10, 11]. In our situation, we performed intravenous anesthesia for the first time with propofol and maintained spontaneous ventilation with halothane, the only halogen we have.

Contrary to what is observed with sevoflurane, the administration of propofol alone exposes to a higher risk of tracheal reactivity [12]. It is therefore necessary to combine a morphine. The administration of propofol (200 to 400 µg/kg/min) and remifentanyl (0.05 to 0.2 µg/kg/min), combined with local anesthesia of the glottis, allows endoscopy to be performed in conditions, while maintaining spontaneous ventilation [10]. Similar results had been reported by Baker et al. for whom higher doses of remifentanyl were compatible with compliance with spontaneous ventilation in children under 3 years of age compared to older children [13]. On the other hand, other authors have shown the interest of inhalation anesthesia in the absence of a full stomach, most anesthesiologists prefer inhalation induction, which allows the maintenance of spontaneous ventilation, in order not to take the risk of increasing airway obstruction by mobilizing a proximal EC [14, 15].

Indeed, hypoxic cardiac arrest can occur during anesthetic induction. However, the favoring role of the initial obstruction or of secondary mobilization has not been clearly established [9]. Currently, the halogenated agent of choice is sevoflurane [16]. This agent is well tolerated haemodynamically and the risk of arrhythmias is lower than with halothane. The realization of a local anesthesia of the glottis by spraying 3 mg/kg of xylocaine is chosen by many teams in order to suppress any laryngeal reactivity and guarantee the opening of the vocal cords, before the passage of the fibroscope or the rigid tube. In our situation, we did not use the machine's default sevoflurane with a sevoflurane vaporizer, which would have allowed for such a rapid awakening.

Few data in the literature are available to help decide between maintaining spontaneous ventilation or switching to controlled ventilation when performing rigid tube endoscopy. Maintaining spontaneous ventilation, at least initially, is usual until the foreign body is identified and located. In the presence of a proximally located EC, maintaining spontaneous ventilation is preferable because assisted ventilation risks being less effective due to the proximal obstruction [17]. Some authors do not find any differences related to the ventilation mode [18]. While for others maintaining spontaneous ventilation is an identified risk factor for intraoperative hypoxia [19]. In a prospective study

carried out in 36 children, by Soodan *et al.* found a benefit in favor of ventilatory assistance. In this study, all the children included in the spontaneously ventilated group benefited from inhalatory anesthesia and had been switched to controlled ventilation due to insufficient depth of anesthesia or episodes of desaturation [15]. Our observation joins that of the authors of the literature, because it seems that the problem is not so much related to the ventilatory mode itself as to the level of depth of anesthesia. After the extraction of the EC we intubated our patient. Our observations agree with the study by Zhang *et al.* [20]. In a prospective study, involving 505 children who underwent bronchoscopy under GA, 9.5% of respiratory complications were reported, and in 81.3% there were minor complications such as incomplete laryngospasm (60.4%), minor desaturation (18.8%) and bleeding (2.1%). In 18.7% of cases, there were major complications: complete laryngospasm (10.4%), pneumothorax (8.3%). The decision to intubate the child after removal of the bronchoscope depends on his respiratory status and the course of the endoscopy (duration, technical difficulties). Most of the time, the awakening of the child is possible at the end of the endoscopy. However, during the recovery period or the immediate postoperative period, respiratory complications are possible. In this study, the authors show that the existence of preoperative respiratory symptoms is a risk factor favoring the occurrence of postoperative respiratory complications.

4. Conclusion

The anesthesia of the child with a suspected foreign body is a real major challenge for the anesthesiologist who must guarantee optimal oxygenation and correct ventilation of the child in order to prevent cardiopulmonary arrest by acute hypoxemia. Intravenous anesthesia with preservation of spontaneous ventilation, good coordination with the surgeon and the combination of equipment (QUICK AIR) with the rigid bronchoscope enabled the successful extraction of the foreign body.

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