



ATELECTASIS IN PAEDIATRIC PATIENTS DURING ANAESTHESIA. CASE REPORTS

Atelectasias en pacientes pediátricos asociadas a la anestesia. Presentación de casos

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Palabras clave (DeCS)

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Summary

Atelectasis, as a consequence of the anaesthetic process, is a frequent finding in imaging studies obtained in the paediatric population. The correct identification of atelectasis and its causal association with anesthesia avoids overdiagnosis and unnecessary exposure to radiation in these patients. We present two cases of atelectasis associated with anesthesia with endotracheal intubation, found in chest images of pediatric patients at the Hospital Universitario San Ignacio during the last year, and compare them with their images obtained under sedation or awake.

Resumen

Las atelectasias, como consecuencia del proceso anestésico, son un hallazgo frecuente en los estudios imaginológicos obtenidos en la población pediátrica. La correcta identificación de las atelectasias y su asociación causal con la anestesia evita el sobrediagnóstico y la exposición innecesaria a radiación en estos pacientes. Se presentan dos casos de atelectasias asociadas a anestesia con intubación orotraqueal en imágenes de pacientes pediátricos del Hospital Universitario San Ignacio durante el último año, comparadas con imágenes de tórax de los mismos pacientes bajo sedación o despiertos.

Introduction

The acquisition of diagnostic images in the paediatric population is, in many cases, a challenge due to the difficulty of keeping patients in the same position for a certain period of time. Therefore, anaesthetic methods, ranging from sedation to general anaesthesia with orotracheal intubation are regularly used to facilitate the obtaining of these studies. However, when images of the thorax are obtained under the effects of these techniques, especially the last one (1), atelectasis (2, 3) can be found with high frequency, which could be-

come confused with pathological findings and lead to overdiagnosis or the use of more studies that generate additional exposure to radiation.

Case reports

Case 1

Male patient of 23 months of age, asymptomatic and with normal clinical examination, with a history of repeated pneumonia and low height, hence suspicion of clinical tuberculosis. A simple chest CT scan was

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performed under general anaesthesia with orotracheal intubation (figure 1 a and b), with multiple consolidation patches in areas of decline in both lungs and sub-segmental atelectasis. Due to the imaging findings and the absence of clinical manifestations at that time, three days

later another CT scan of the chest was performed with intravenous contrast medium and under sedation (figure 2 a and b), in which there is evidence of complete resolution of the findings with respect to the previous tomography.

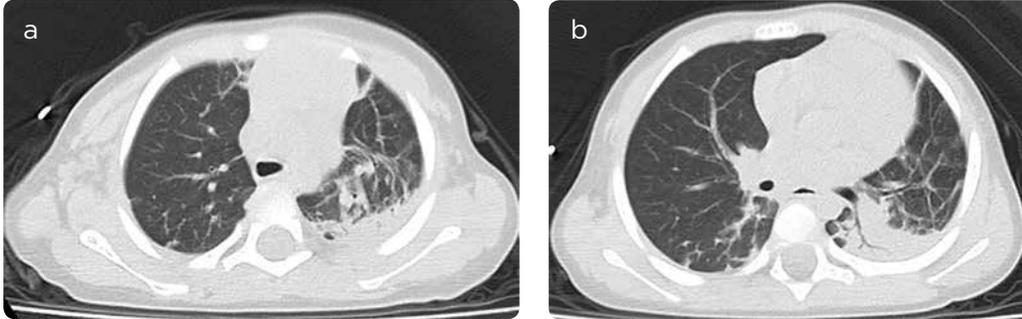


Figure 1. a and b) Single chest CT under general anaesthesia with orotracheal intubation. Areas of pulmonary consolidation are observed in decline areas, mainly in the left lung, associated with signs of loss of lung volume.

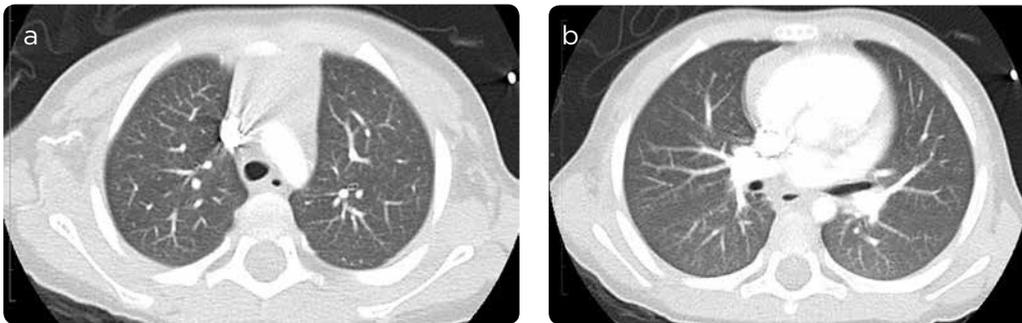


Figure 2. a and b) Chest CT with contrast medium, awake patient. Resolution of consolidations and recovery of left lung volume is observed.

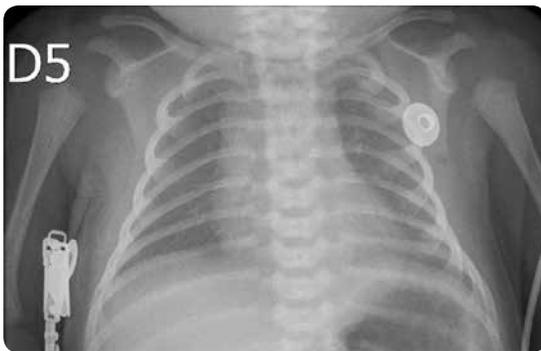


Figure 3. Chest x-ray in decubitus. No alterations are observed.



Figure 4. a and b) Chest CT under general anaesthesia. Sub-segmental atelectasis is observed in decline areas of bibasal predominance.

Case 2

Full term neonatal female born by vaginal delivery, which during neonatal adaptation presented cyanosis and nasal flaring with requirement for supplemental oxygen the first few minutes. Chest X-ray was requested (figure 3), with normal results. Within the prenatal history, as the only important finding, we found an ultrasound result with cystic image without internal echoes, compatible with bronchogenic cyst, so that three days after birth a chest scan was performed to study the pulmonary parenchyma, under general anaesthesia with orotracheal intubation (figure 4 a and b), in which subsegmental atelectasis are observed in areas of decline that were not in the previous x-ray.

Discussion

Atelectasis is defined as an area of incomplete pulmonary expansion (4), in which there is crowding of the vascular and bronchial structures (3), which in radiography are observed as areas of opacity associated with other signs of displacement of thoracic structures (5), and in CT are determined as areas with attenuation values ranging from -100 to +100 Hounsfield units (1).

Anaesthesia has been attributed as a cause of atelectasis in patients of all ages (2). Studies show that during anaesthetic induction with orotracheal intubation, atelectasis may occur in up to 87% of patients (2, 6), involving an average of 15 to 20% of all lungs (6). In paediatric patients, atelectasis associated with the anaesthetic process appear rapidly after anaesthetic induction and are generally seen in dependent pulmonary regions, where alveolar size is smaller and blood flow is greater (1,7). These atelectasis disappear within 24 hours (1).

The appearance of atelectasis secondary to the anaesthetic process is related, on the one hand, to changes generated in the ventilation/perfusion rate (8) and, on the other hand, to loss of muscle tone and lack of spontaneous breathing, which makes it difficult to open the collapsed alveoli, reduces residual functional capacity and promotes alveolar collapse and gas reabsorption (7). Additionally, because the elastic recoil of the chest is smaller (1, 8) and collateral ventilation is less developed in children (3), they are more prone to the development of atelectasis.

In paediatric patients, due to their longer life expectancy and sensitivity to radiation, there is concern about radio-induced pathologies. Considering that CT studies are one of the major sources of radiation within diagnostic images, it is important to reduce unnecessary re-exposure and avoid the repetition of examinations for diagnostic doubts (9), when the clinical-imaginological correlation allows the findings to be deduced as secondary atelectasis to anaesthesia. On the other hand, studies have shown that atelectasis tend to appear much more frequently in general anaesthesia with orotracheal intubation, compared to sedation (1), so the latter technique has been recommended over the former (3,10).

Conclusions

The atelectasis associated with the anaesthetic process is a frequent finding in paediatric patients, which can sometimes divert the diagnosis and lead to unnecessary re-exposure to radiation, so it is important to correlate the symptomatology and laboratory examinations, as well as the condition of the patient during imaging, to achieve a better diagnostic approach. The cases presented show imaging findings that

corresponded to atelectasis associated with anaesthesia, which in the first case were diagnosed as pathological, and in the second were considered normal, thanks to the correlation with the previous image

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