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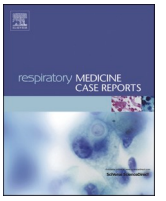

Case report

A rare chest tumor in a 7-year old girl with a neurodegenerative disease

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ABSTRACT

We report the case of a 7-year-old girl with a history of San Filippo disease who presented with gingivitis and painful chest tumefaction. Microbiology of this tumefaction identified *Aggregatibacter actinomycetemcomitans* (AA), a slowly growing, commensal, Gram negative bacillus that is a very unusual cause of thoracic infection. We discuss this case in the light of available literature of pediatric cases of AA thoracic infection. *Conclusion*: a tumor-like chest mass in a patient with multiple disabilities should evoke an invasive AA infection.

1. Introduction

Aggregatibacter actinomycetemcomitans (AA) is a gram-negative bacillus present in the oral commensal flora and often responsible for periodontal disease [7]. AA systemic, especially pulmonary, infections are infrequent, yet should be considered when a patient presents with thoracic tumor-like symptoms [7].

2. Case report

A 7-year-old girl, with San Filippo disease (mucopolysaccharidosis type IIIB) diagnosed at the age of 3, was admitted for deterioration of general condition since 15 days. Anamnesis revealed multiple nocturnal awakenings, crying, agitation, loss of appetite, asthenia, and 2 kgs weight loss. She was afebrile. Baseline neurological examination (no language, behavior and interactions disorders, walking disorders, oral diet requiring help) was clearly modified with total lost of her ability to interact, with a pain facies, degradation of walking and prostration. Buccodental examination revealed severe gingivitis. Cardio-respiratory, digestive and cutaneous examinations were normal. A brain computed tomography and an ophthalmic examination eliminated the hypothesis of intracranial hypertension related to her mucopolysaccharidosis.

After 3 days of hospitalization a painful tumefaction appeared under her left nipple, without any cutaneous anomalies. The chest X-ray revealed a left basithoracic opacity erasing the diaphragmatic dome, with pleural effusion, bronchial syndrome, and enlargement of the ribs and clavicle in relation with the underlying pathology (Fig. 1). The transparietal ultrasonography revealed a heterogeneous mass, partially liquid, with a parietal and abdominal extension, mediastinal and internal mammary lymph nodes, and confirmed the

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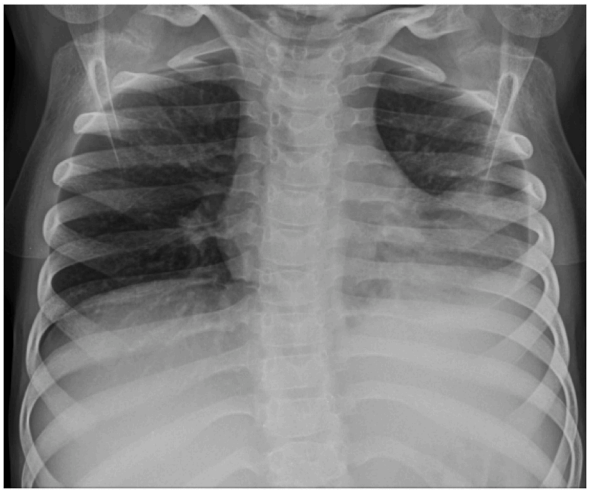


Fig. 1. Chest X-ray (A) of a 7-year old girl with an Agreggibacter actinomycetemcomitans thoracic infection
Chest X-ray revealing a left basithoracic opacity, a pleural effusion, and an enlargement of the ribs and clavicle in relation with the underlying pathology.

pleural effusion. The CT-scan confirmed the presence of a left anterior basithoracic mass with pleurodiaphragmatic and anterior transparietal extension, of liquid nature and compartmentalized (Fig. 2). These characteristics suggested the diagnosis of actinomycosis.

Laboratory tests showed a white blood cell count of 19G/L (neutrophils 13 G/L), C reactive protein at 186 mg/L and sterile blood cultures. The needle biopsy of the chest mass revealed a thick purulent fluid and the histological examination showed many neutrophils and a few histiocytes. Bacteriological examination was positive for a multisensitive *Aggregatibacter actinomycetemcomitans*. The cardiac echography was normal. Amoxicillin (150 mg/day orally) was started in association with nalbuphin and paracetamol (analgesics) and hydroxyzine (anxiolytic). During the days after the needle biopsy, the mass grew quickly and a cutaneous fistula appeared 10 days later (Fig. 3). Antibiotic was discontinued after 2 months when clinical and radiological improvements were obtained.

3. Discussion

Identified for the first time in 1912, *Aggregatibacter actinomycetemcomitans* (AA) was initially named *Actinobacillus actinomycetemcomitans* because of its frequent but not obligate association with actinomycosis.

AA is an anaerobic bacillus, with a slow growth, belonging to the HACEK group (*Haemophilus parainfluenzae*, *Aggregatibacter actinomycetemcomitans*, *Aggregatibacter aphrophilus*, *Aggregatibacter paraphrophilus*, *Cardiobacterium* spp., *Eikenella corrodens* and *Kingella* spp.) [8]. Clinical presentation of AA infections is very close to actinomycosis. AA is one of the causative pathogens of periodontal disease and more rarely the culprit for severe systemic infections [2,5,14]. AA colonization in children and adolescents seems to be affected by socioeconomic and cultural factors, factors affecting also the periodontal condition of the subjects [10,11]. In the literature, the relationship between AA presence in the oral cavity and the development of invasive AA infection remains unclear [6]. However, AA is the most frequent cause of gram negative endocarditis in children. Other organs can be involved and soft tissue abscess, cerebral abscess, and urethritis are described [1,3,13].

Pulmonary involvement is a less frequent complication and may become a diagnostic challenge [7]. It shares many similar clinical features with chronic suppurative lung infections, such as tuberculosis, fungal infections and lung abscesses, and also lung malignancy with which it is commonly confused. All can present with non-specific symptoms such as cough, chest pain, hemoptysis, weight loss, fever [4]. In addition, radiographic findings of infectious processes occasionally present as a slow-growing pulmonary or mediastinal mass-like lesion. Thoracic infection has often been linked to dental manipulation and periodontal disease [9]. It is hypothesized that the transmission is associated to oral aspiration, particularly in swallowing disorders [8]. Thoracic infection begins at the alveolar level before invading the pleura, soft tissues and bony structures [4]. A chest wall fistula is described in several cases, and extension across the diaphragm is possible.

To our knowledge, only 10 pediatric case reports of severe AA infection, with eight of them involving the lungs, have been previously reported (Table 1). Including our case, a clear female predominance (7/11) is noted. Periodontal disease is frequent (8/11). An underlying disease is present in half of the cases, as in our case. Clinical examination shows a chest mass (9/11) in most cases. To note, the infection has a fatal issue in one patient. We would like to draw attention to the association of AA infection with mental subnormality. Severely mentally children have bad oral hygiene and tooth decay, which may be difficult to ascertain as oral examination may often require general anaesthesia [12]. Overall, such patients are at high risk of developing periodontal disease. Diagnosis of thoracic AA is often delayed, because the first clinical signs appear once the mass is bulky [11,12]. In addition, the clinical examination, as in our case, is even more difficult in children with neurodevelopmental disorders. It is important to emphasize that in these situations of disability in children, it is necessary to be very attentive to the parental worry and to any modification of the child's behavior. In our case the first symptom of the infection was psychomotor regression.

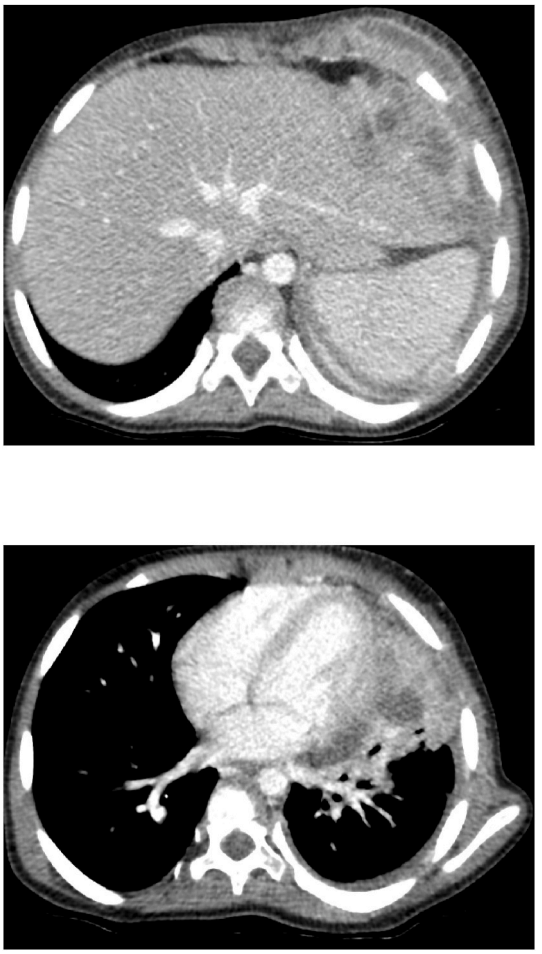
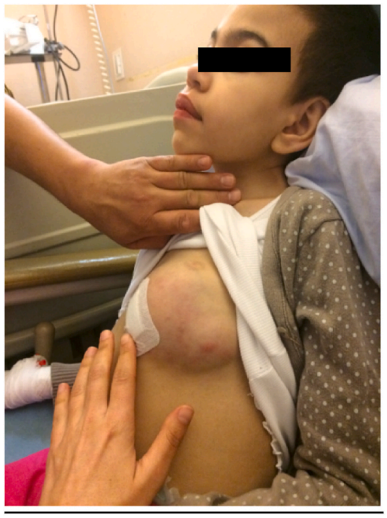


Fig. 2. Chest-tomodensitometry of a 7-year old girl with an Agreggibacter actinomycetemcomitans thoracic infection.
Left anterior thoracic mass with a pleurodiaphragmatic and anterior transparietal extension, of liquid nature and compartmentalized.



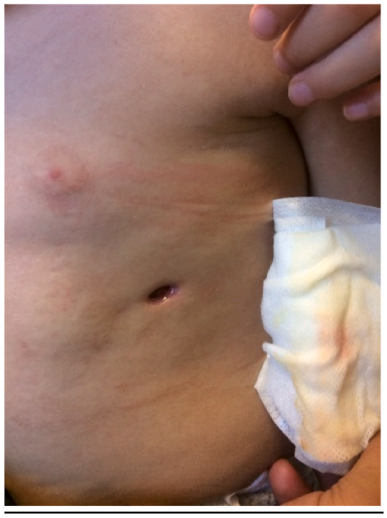


Fig. 3. Pictures of a 7-year old girl with an Agreggibacter actinomycetemcomitans thoracic infection.
Picture of our patient a few days after the needle biopsy: the mass grew quickly and a cutaneous fistula appeared 10 days later.

A definitive diagnosis requires tissue sampling [11]. As culture is not easy, the best method to identify AA is the bacteriological the arbitrarily primed polymerase chain reaction (AP-PCR) on the puncture liquid [14]. Blood cultures are generally negative. The treatment of choice for AA infections is most commonly penicillin A often in conjunction with an aminoglycoside [7]. The duration of therapy varies and depends on the clinical response of the patient. Prolonged treatment (3–12 months) is sometimes necessary. In the absence of clinical improvement with antimicrobial therapy, a search for undrained abscess, necrotic tissue or a mixed infection with resistant bacteria should be initiated. Due to low incidence of AA infection, prophylactic antibiotic prior to dental treatment is not validated and not proposed, even in children with disability.

Table 1
Comparative data of the published pediatric case reports of *Aggregatibacter actinomycetemcomitans* systemic infection.

Reference	[13]	[1]	[7]	[7]	[7]	[7]	[7]	[7]	[5]	[9]	Our patient
Age (years)	4	1.5	8	9	10	17	13	14	9	11	7
Sex	F	F	F	F	F	F	M	F	M	M	F
Disease	No	Cardiac defect	Tracheostomy	Prematurity	No	Cerebral palsy	No	No	No	Autism	San Filippo
Gingivitis	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Fever	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	No
Thoracic mass	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other manifestations	Septic arthritis	Endocarditis	Pleural effusion, rib destruction	Pleural effusion, chest wall evasion, rib destruction	Hilar lymph nodes	Pleural effusion			Pleural effusion, rib destruction	Pleural effusion, rib destruction	Pleural effusion, parietal extension, mediastinal lymph nodes
Diagnosis delay	7 days	7 days	14 days	30 days	1 year	10 days	1 year	6 weeks	6 weeks	>3 months	15 days
Outcome	No sequelae	No sequelae	No sequelae	No sequelae	Survived	Died	Survived	Survived	Survived	No sequelae	Survived

4. Conclusion

Invasive AA infection should be considered for a tumor-like chest mass in patients with poor dentition, and even more so in patients with multiple disabilities.

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Ethical approval

This article does not contain any interventional studies with human participants or animals performed by any of the authors.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Declaration of competing interest

The authors declare that they have no conflict of interest.

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