

Pillow Feather–Associated Unusual Neck Complication in a Young Child

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Received March 29, 2016. Received revised March 29, 2016. Accepted for publication March 30, 2016.

Case Report

A 3-year-old healthy female child presented to her pediatrician's office with left-sided submandibular neck swelling for 16 days. On clinical examination, a "pillow-feather" on left side of her neck with a tender non-pulsatile swelling was noted (Figure 1). She was referred to a nearby emergency department (ED), the feather on the neck was removed and was prescribed a course of oral antibiotics. Over the next 3 days, she developed fever and increased left neck swelling. She was seen at another ED where computed tomography (CT) scan of the neck was performed and showed left neck abscess. The patient was subsequently admitted to an outside hospital where incision and drainage of left neck abscess was done, and she received intravenous antibiotic treatment with vancomycin and ceftriaxone for 4 days. Cultures from the neck abscess grew *Streptococcus viridians* group, *Staphylococcus* species, and *Eikenella*, all sensitive to ampicillin/sulbactam. The patient was subsequently discharged home to continue treatment with oral amoxicillin/clavulanate. The night before hospital discharge, she was noted to have some bleeding from the surgical site which was later controlled with pressure so she was discharged as planned.

After a week, she returned to the ED with worsening left-sided neck swelling and restricted neck movement. On examination she was found to be hypotensive and tachycardiac with blood pressure 85/60 mm Hg and pulse of 110 beats/min. Examination of her neck revealed a 1-cm horizontal incision on the left side. There was erythema, induration, tenderness, and extensive soft tissue swelling of the area over the anterior triangle of the left neck. The rest of the physical examination was unremarkable. Contrast-enhanced CT scan of the neck was repeated and showed hyperdense collection in the soft tissues of the left neck region posterior to the angle of the mandible, which demonstrated continuity with a branch of the left external carotid artery. This collection demonstrated mass



Figure 1. Pillow feather can be seen on the left side of the neck.

effect on the adjacent internal and external carotid arteries with medially displaced (Figure 2). Coronal view showed multiple ill-defined low-attenuation round areas throughout the soft tissues of the left neck region with no distinct enhancing contours. Based on these findings, the patient was transferred to our institution for further management. On route, bleeding from the incision site was noted, but subsided on arrival.

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Figure 2. Hyperdense collection in the soft tissues of the left neck region posterior to the angle of the mandible, which demonstrated continuity with a branch of the left external carotid artery. Medial displacement of the left internal and external carotid arteries seen on CT scan.

Final Diagnosis

Pillow feather–associated external carotid artery pseudoaneurysm and neck abscess in a young child.

Hospital Course

She was started on intravenous clindamycin and ceftriaxone treatment. Based on the CT scan and neck angiogram findings (Figures 2 and 3), repair options were considered and endovascular occlusion via coiling of the pseudoaneurysm with embolization was done by interventional radiology successfully without complication (Figure 4). Subsequent duplex scan of carotid artery 3 days after the coiling procedure showed heterogeneous solid echogenic soft tissue mass (2.6 cm in diameter) in the region of the prior false aneurysm. This represents thrombosed aneurysm with no flow signal identified, which indicates that the prior procedure was successful. She was discharged home to continue intravenous clindamycin and ceftriaxone treatment for a total of 6 weeks, with ultimate resolution of her deep neck infection.

Discussion

The use of feather pillows or duvets can lead to serious health consequences, especially among young children.¹ Down-bedding can be hazardous for children due to the possibility of feather leaking. Due to the delicate thin skin of children, sharp feather can easily penetrate the



Figure 3. Large pseudoaneurysm from the very proximal left external carotid artery immediately after the takeoff of the facial and lingual trunk.

skin leading to subsequent infection or even trauma to the vital structures including blood vessels, as described in our case.

Review of the medical literature predominantly reported allergic and asthmatic symptoms in patients exposed to feather bedding.² Further review revealed a rare case of a 30-year-old chicken feather pillow that had been infected by the fungus *Histoplasma capsulatum*, which resulted in the development of disseminated histoplasmosis in an infant who had slept with the pillow.³ Moreover, there are other case reports of neck abscess resulting from exposure to pillow beddings^{1,4} and a video on YouTube uploaded by parents of a 7-month-old child with neck swelling due to a 2-inch black feather.⁵ Inhalation of organic dust due to goose or duck feathers in bedding has also been shown to cause feather duvet lung, which manifests as extrinsic allergic alveolitis.⁶ However, to date no previous reports of pseudoaneurysm potentially caused by feather penetration have been reported.

Deep neck space infections are infections in the potential spaces and fascial planes of the neck resulting from lymphadenitis, cellulitis, necrotic node, or abscess in nature. Delay in diagnosis and prompt management can lead to life-threatening complications such as airway obstruction, jugular vein thrombosis, carotid artery



Figure 4. Permanent coil embolization of the proximal external carotid artery immediately proximal to the pseudoaneurysm using platinum detachable coils.

aneurysm or rupture, mediastinitis, and sepsis.⁷ Deep neck space infections can occur at any age. However, pediatric neck infections require more intimate management because of their rapidly progressive nature.⁸ When the diagnosis of abscess is made, prompt surgical drainage can prevent morbidity and mortality. The most common signs and symptoms of neck abscess are the presence of neck mass or swelling, fever, or poor oral intake. Other symptoms include neck pain, irritability, decreased neck mobility, sore throat, and upper airway obstructive symptoms.⁷ In our case, the patient presented with neck soft tissue swelling, decreased neck movement, and fever.

Visual clinical assessment of lateral neck infections can be inaccurate as suppuration may not be evident on physical examination; therefore, radiographic testing is often needed.⁹ CT scan is the most widely used radiological assessment for diagnosing deep space abscesses because it is less expensive and is readily available.¹⁰ Magnetic resonance imaging is another option given improved soft tissue definition without the use of radiation but may not be readily available.^{10,11} Doppler ultrasound of the neck can also be done but CT or magnetic resonance angiography of the neck are preferred.^{7,10}

Most studies have reported the predominance of *Streptococcus* sp. and *Staphylococcus aureus* as causative

organisms for deep neck infections, although infections are often polymicrobial. The presence of anaerobes may be underestimated because of the difficulty in culturing them.⁷ Treatment with antibiotics targeted against these organisms as well as surgical drainage with securing the airway are the mainstay of treatment.¹² Although studies have reported success in treating deep neck abscess medically with parenteral antibiotics, most still consider incision and drainage as the gold standard for the majority of pediatric deep neck abscesses.¹³

In our case, the cause of left external carotid artery pseudoaneurysm may be due to direct irritation caused by the pillow feather leading to perforation and tear of the adjacent vessel wall or iatrogenic during the initial incision and drainage procedure. Nevertheless, dealing with foreign bodies in vital areas like the neck needs extra care and skill. Special attention should be used while draining an abscess caused by foreign body or removing a foreign body in the neck area to avoid damaging adjacent blood vessels.

Management of pseudoaneurysm requires a detailed preoperative assessment to determine the appropriate treatment regimen such as image-guided standard clipping and/or coiling. CT and computed tomography angiography are the best modalities used to assess the extent of aneurysm. Magnetic resonance imaging can also be used to identify intraaneurysmal components such as thrombus.¹⁴ In our case, CT scan of the neck was done, which revealed pseudoaneurysm adjacent to the left external carotid artery. The pseudoaneurysm was subsequently treated by standard coiling with embolization, which is a minimally invasive endovascular procedure to isolate an aneurysm from the normal circulation. Flexible femoral catheter is inserted, and once it reaches the aneurysm a very thin platinum wire is inserted. The platinum wire coils as it enters the aneurysm and is then detached. Multiple coils are packed inside the dome to block normal blood flow from entering. Over time, a clot forms inside the aneurysm, effectively removing the risk of aneurysm rupture. Coils remain inside the aneurysm permanently. Image-guided direct percutaneous and endovascular embolization of pseudoaneurysms are established treatment options with favorable success rates and minimal morbidity. The pendulum has now swung from invasive surgical repair of pseudoaneurysms to that of less invasive image-guided interventional radiologic treatment.¹⁵

Conclusion

Parents and pediatricians should be aware of the risks associated with down-beddings including infection of deep neck spaces and associated pseudoaneurysms.

Infections in the deep neck spaces may result in mortality if they are not diagnosed and treated promptly. Clinical examination along with radiological evaluation provides important information in determining the origin and extension of disease and increases the accuracy of diagnosis.

Pseudoaneurysm formation can result due to irritation from the presence of foreign body or during manipulation process. Extra care and skill is needed when performing procedures associated with removal of foreign bodies from the neck area. If there is any evidence that neck vessels might be involved, the patient should be referred to a center that is fully prepared with all the necessary staff and equipment to care for a patient who may be at increased risk of complications associated with vessel injury.

Author Contributions

MU: contributed to conception and design; contributed to analysis and interpretation; drafted manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

NS: contributed to acquisition, analysis, and interpretation; drafted manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

JYA: contributed to conception and design; contributed to acquisition, analysis, and interpretation; drafted manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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