

# Cervical Pannus Without Rheumatoid Arthritis or Trauma

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Although usually seen in patients with rheumatoid arthritis, cervical pannus also can develop in patients who have had spine surgery.

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**C**ervical pannus is a disease that could easily develop in an active-duty soldier or veteran. The disease has been associated with trauma and rheumatoid arthritis, or can be idiopathic. For years, cervical pannus has been closely tied to rheumatoid arthritis; however, a study published in 2019 showed that only 28% of patients with cervical pannus had an associated diagnosis of rheumatoid arthritis.<sup>1</sup> In the same study, 18% of patients had undergone some type of prior cervical spine surgery as the next most common cause. The condition also can occur years after an injury.

## BACKGROUND

In the US, 42,000 veterans are living with spinal cord disease, and thousands of these veterans have surgery every year.<sup>2</sup> Service men and women and veterans are at risk for cervical pannus as they age especially if they have a history of rheumatoid arthritis, cervical spine surgery, trauma, and numerous other causes. It is critical for health care providers who treat this population to understand cervical pannus, how to recognize it, and how to identify patients at risk. A cervical pannus can be life threatening if not detected and treated properly.

There is no clear definition for cervical pannus. Some researchers think of it as the chronically inflamed synovial membrane in patients with rheumatoid arthritis (RA); others consider it as a specialized synovial membrane derived from vascular soft tissue structures at or near the bone synovial membrane.<sup>3</sup> The pathogenesis for developing a pannus is not well understood, and little is known when a pannus begins or its initial location. A pannus formation can occur in any synovial joint in the body, such as wrists, metacarpophalangeal joint, proximal inter-

phalangeal joint, and cervical joints.

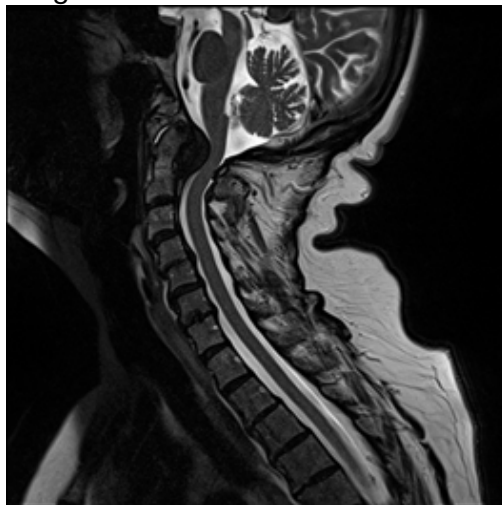
A cervical pannus can cause serious complications. It can lead to a cervical subluxation in up to 4% of patients with RA, or it also can occur spontaneously in some patients without RA especially those with trauma or cancer.<sup>4</sup>

There are 2 suggested mechanisms by which the synovial membrane proliferates. It was originally believed that T cells from the chronic inflamed joint lead to the pannus formation by initiating an autoimmune reaction through the production of different cytokines against arthritogenic agents.<sup>3-5</sup> These cytokines increase inflammation by recruiting neutrophils and activating various kinds of macrophages that might lead to increased osteoclast activity.<sup>6</sup> Osteoclastic activity can damage bone and allow the synovium to penetrate the bone, forming the pannus.

Another proposed mechanism is that the synovial cells hyperpolarize and hypertrophy automatically without T-cell help by expressing oncogenes and their proteins.<sup>3</sup> In either case, angiogenesis follows this proliferation and increases the influx of inflammatory cells into the joints, which can lead to more destruction.<sup>7</sup> This increase in blood supply to the synovial membrane is important in the growth of the pannus and can have a damaging effect to cartilage, bone, and joints.<sup>4,7</sup>

Cervical pannus can progress in patients with prolonged use of corticosteroids.<sup>8</sup> Because a pannus can put pressure on any segment of the cervical spine and the cranio-cervical junction leading to cervical instability, patients with this condition may present with a variety of clinical symptoms.<sup>9</sup> The most frequently reported clinical features include neck pain, easy fatigability, difficulty walking, abnormal gait, increased clumsiness, and numbness and

**FIGURE 1** Sagittal Magnetic Resonance Image



Cervical compression at atlanto-occipital space.

tingling in the arms. Patients also may complain of neck stiffness and decreased neck motion.<sup>10</sup>

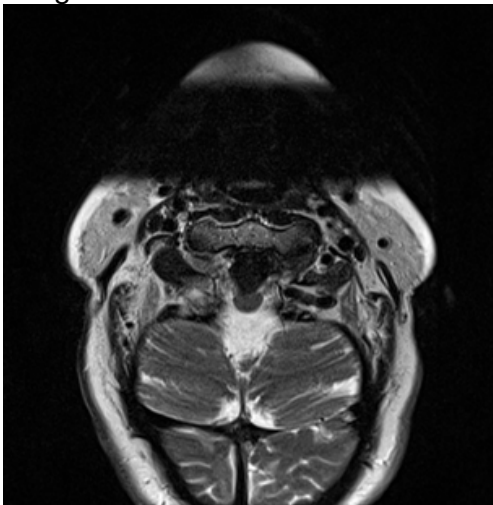
Cervical pannus is most frequently seen in patients with RA. However, patients without a RA diagnosis and incidental atlantoaxial pannus on cervical spine magnetic resonance imaging (MRI) are unlikely to have previously undiagnosed RA.<sup>11</sup>

### CASE PRESENTATION

A 70-year-old white woman presented to the neurology clinic at Gretna Medical Center in Virginia in December 2016 with constant headache and imbalance that started in September 2016. She characterized the pain as predominately pressure (6 on a 10-point pain scale) with occasional shooting pains. The pain started at the left occipital lobe and radiated toward the left temporal lobe and left eye. The patient also stated that it was very difficult to lay her head down on a pillow to sleep and that she had to use a recliner in order to sleep over the past 3 months. She reported that the headache felt slightly worse if she had a lot of repetitive head and neck movements during the day. There was no photophobia, phonophobia, nausea, vomiting, facial paresthesias, lacrimation, nasal congestion, confusion, or impaired speech.

The patient's lack of balance, which resulted in an unsteady gait, had started 1 month before and had increased significantly in the past 2 to 3 weeks. She stated

**FIGURE 2** Axial Magnetic Resonance Image



Compression at atlanto-occipital space.

that the unsteady gait was associated with numbness in her right upper and lower extremities, although more intense in the right lower extremity. Aside from the headaches, paresthesia, and unsteady gait, the patient reported no other major symptoms. She did not smoke tobacco or drink alcohol. Her family history revealed that her brothers had heart disease.

The patient's vital signs at physical examination included heart rate, 83 beats per minute; blood pressure, 159/75 mm hg; temporal temperature, 97.9 °F; and respiratory rate, 20 breaths per minute. The patient's gait was unsteady, needing stabilization by holding on to her husband's arm, slightly favoring right lower extremity. Finger-to-nose testing, rapid alternating movements, heel-knee-shin testing were all normal. The Romberg sign was positive. The patient could rise on toes and heels with slight balance disturbance. Deep tendon reflexes and reflexes in the upper and lower extremities was symmetric 2+ bilaterally. Musculoskeletal examination revealed strength and tone in all major muscle groups and demonstrated symmetrical movements with no fasciculation noted. A rheumatologic evaluation showed no abnormalities, including inspection of hands, feet, major joints, and other range of motion, besides her neck. The rest of the physical, cognitive, and neurologic examination findings were otherwise unremarkable. A routine rheumatologic laboratory evaluation was negative.

**FIGURE 3** Plain Film Radiograph Showing C2-Occipital Repair Postsurgery



A head computed tomography ordered before coming to the clinic showed normal results. An MRI of the head was obtained to evaluate for ischemic cause or structural abnormality (Figures 1 and 2). Given the patient's presentation and the pattern seen on the MRI results, it was determined that large pannus posterior to the dens, severely narrowing the spinal canal, was most likely the diagnosis. A second opinion confirmed the diagnosis, and a second MRI revealed stabilization with no signs of enhancement.

The patient was advised to meet with a neurosurgeon to remove the pannus. The patient agreed on occiput to C2 posterior instrument arthrodesis as well as decompression. A plain film radiograph showed C2-occipital repair after surgery (Figure 3). The patient recovered in the neurosurgical intensive care unit, and the rest of the recovery was uncomplicated. She showed some improvement in her headaches and unsteady gait. A postoperative pathologic evaluation of tissue was not available. She was referred to a rheumatologist to rule out an autoimmune disease as the cause for this pannus, but no autoimmune disease was found.

### DISCUSSION

Cervical pannus is relatively uncommon in those without RA. However, there are multiple reasons that a patient could develop a

cervical pannus. Cervical pannus in RA and cervical pannus without RA may mimic each other clinically, but medical management is distinctly different. Consequently, a rheumatology consult is necessary to ensure that there is no undiagnosed autoimmune disorder. Our patient did not have RA, and a neurosurgery intervention was needed to manage her headaches and unsteady gait. Although we could not isolate a cause of this patient's cervical pannus development, we believed that nonintervention would adversely affect this patient.

The course of pannus progression can be fatal especially if left untreated.<sup>12</sup> MRI can detect a pannus and may be helpful for planning surgery.<sup>13</sup> Surgical resection has been the treatment of choice for patients with neurologic symptoms.<sup>14</sup> However, some cases have reported resolution of pannus associated with RA and other forms of chronic atlantoaxial instability only after posterior stabilization.<sup>14</sup>

In order to manage pannus, cervical spine examination for the diagnosis of cervical involvement is encouraged to prevent morbidity and mortality.<sup>13</sup> There are new data that demonstrated the potential of using retinoid X receptor agonists, such as bexarotene, as a treatment against the development and progression of pannus.<sup>14</sup>

### CONCLUSIONS

We present a patient with cervical pannus disease without RA whose diagnosis was based on the pathognomonic pattern seen on MRI. She showed a clinically significant recovery with an occiput to C2 posterior instrument arthrodesis as well as decompression. She showed marked improvements in her headaches and unsteady gait. This case report highlights the importance of realizing cervical pannus as a disease found in patients without RA. It serves as an alert to clinicians for timely detection, diagnosis, and initiation of treatment to prevent mortality and long-term neurologic sequelae of cervical pannus.

Although further studies of early diagnosis and treatment for cervical pannus are warranted, we propose that including pannus in a differential diagnosis for patients with no RA could be lifesaving.

### Author disclosures

The authors report no actual or potential conflicts of interest with regard to this article.

## Disclaimer

The opinions expressed herein are those of the authors and do not necessarily reflect those of *Federal Practitioner*, Frontline Medical Communications Inc., the US Government, or any of its agencies.

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## CORRECTION

In Tran EM, Tank KS, Chen AJ, et al. Refractive outcomes for cataract surgery with toric intraocular lenses at a Veterans Affairs medical center. *Fed Pract*. 2020;37(3):138-142. The following abstract section was omitted: **Conclusions:** To our knowledge, this is the largest study that compared the performance of the Barrett toric and Holladay 2 formulae and the first that made the comparison in a teaching hospital setting. This study suggests that the 2 formulae have similar refractive outcomes across all axial lengths." This article was corrected online.