In the last 15–20 years there has been a threefold increase in patients who are immunocompetent, and the causative factors for this increase are unknown [1-3]. PCNSL commonly presents as a rapidly space-occupying lesion. Rarely, patients without obvious brain parenchymal masses, and is limited to the cranial-spinal axis, without systemic disease. A known high-risk group for PCNSL patients who are immunocompetent, and the causative factors for this increase are unknown [1-3]. Our case has remarkable similarities with the nine cases of PLML reported by Lachance et al [4]. These authors believe that PLML is a distinct clinical entity. Abnormal CSF is present in 80% of PCNSL cases with hypoglycorrhachia, increased protein levels or pleocytosis. It has been stated that finding malignant cells in the CSF is rare, with an incidence of 10–25% [1-4].

In a patient with pleocytosis, the first cause suggested will usually be central nervous system infection. Our patient also had remarkable similarities with chronic meningitis in his symptoms and the findings of physical and CSF examinations. However, other causes of pleocytosis must be remembered too, and PCNSL, or PLML, has therefore to be added to the differential diagnosis of chronic meningitis.

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References

Corynebacterium pseudotuberculosis infection in a butcher
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Infections due to Corynebacterium pseudotuberculosis are frequent in sheep and goats. However, infections due to this microorganism are rare in humans. To our knowledge, there have been only 13 cases described in the literature [1–11]. Since cultures growing Corynebacterium species are frequently considered to be contaminated, it is conceivable that the incidence of this disease is underestimated in human beings.

A 30-year-old Turkish man attended the surgical outpatient clinic because of a painful epitrochlear swelling on his left arm which had been present for 1 month. His past medical history was unremarkable. He denied ever having had venereal disease or venereal exposure. He had immigrated from Turkey to Switzerland 2 months earlier and he was unemployed. In Turkey, he had worked as a sheep rancher and butcher. He could not remember any previous trauma. His parents and his 11 sisters and brothers were living and healthy. The patient was afebrile and did not report symptoms of systemic disease. Clinical examination showed a firm, large (7×5 cm), moderately tender, non-inflamed, non-fluctuant swelling on his left arm which was attached to the humerus. In addition, there was a large (3 cm) tender axillary lymph node. The laboratory work-up revealed normal hematologic values except for a leukocytosis of 12×10⁹/L. The C-reactive protein was 11 mg/L. An HIV screening test was negative. A soft tissue swelling but normal bone structure were seen in radiographs of the upper arm. Magnetic resonance imaging showed a mass of 7×4×3 cm between the triceps and biceps muscles infiltrating the muscle and the neurovascular bundle. This finding was interpreted as either abscess or sarcoma. With this differential diagnosis, a biopsy was performed but the operation revealed an abscess, which was drained. A total excision was not feasible because of infiltration of the muscle, vessels and nerve. Gram stain of the pus showed polymorphonuclear leukocytes, but no microorganisms. Two tissue samples grew C. pseudotuberculosis within 5 days. This isolate was initially interpreted as a contaminant. When the histology (see below) became available, it was considered to be the causative agent. Oral antimicrobial therapy with clarithromycin (500 mg b.i.d) was started for 2 weeks. After 3 weeks, the wound had healed and the axillary lymph node had become smaller. Three months later, the patient was readmitted to the hospital because of a recurrent large painful epitrochlear swelling on his left arm with erythema around the scar and a large fluctuant axillary node. He denied other symptoms.
Table 1 Human cases with *Corynebacterium pseudotuberculosis* infection

<table>
<thead>
<tr>
<th>Reference</th>
<th>Sex, age</th>
<th>Exposition</th>
<th>Clinical presentation</th>
<th>Treatment</th>
<th>Complication</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M, 37</td>
<td>Grass cutter</td>
<td>Malaise, inguinal lymphadenopathy, malgia, hepato- and spleno-</td>
<td>Tetracycline, excision</td>
<td>None</td>
<td>3 weeks</td>
</tr>
<tr>
<td>2</td>
<td>M, 28</td>
<td>Sheep rancher</td>
<td>Inguinal lymphadenopathy, painful calf lesion</td>
<td>Penicillin, probenecid, excision, drainage</td>
<td>Sinus tract, relapse of abscess</td>
<td>1 year</td>
</tr>
<tr>
<td>3</td>
<td>M, 24</td>
<td>Sheep shearer</td>
<td>Asymptomatic axillary lymphadenopathy, sinus tract after puncture</td>
<td>Penicillin, excision</td>
<td>Sinus tract</td>
<td>9 months</td>
</tr>
<tr>
<td>4</td>
<td>M, 23</td>
<td>Butcher</td>
<td>Tender axillary lymphadenopathy, fever, hepato- and spleno-</td>
<td>Tetracycline, excision</td>
<td>Sinus tract</td>
<td>8 weeks</td>
</tr>
<tr>
<td>5</td>
<td>M, 20</td>
<td>Sheep rancher</td>
<td>Axillary lymphadenopathy</td>
<td>Excision</td>
<td>None</td>
<td>&quot;Many months&quot;</td>
</tr>
<tr>
<td>6</td>
<td>M, 40</td>
<td>Rural worker</td>
<td>Inguinal lymphadenopathy</td>
<td>Tetracycline, incision</td>
<td>Sinus tract, secondary wound infection</td>
<td>Not reported</td>
</tr>
<tr>
<td>7</td>
<td>E, 30</td>
<td>Housewife with contact with sheep</td>
<td>Asymptomatic cervical lymphadenopathy</td>
<td>Antibiotics, excision</td>
<td>Not reported</td>
<td>&quot;Long period&quot;</td>
</tr>
<tr>
<td>8</td>
<td>M, 21</td>
<td>Silo worker, previously abattoir worker</td>
<td>Painful axillary lymphadenopathy</td>
<td>Clindamycin, excision</td>
<td>Sinus tract</td>
<td>3 months</td>
</tr>
<tr>
<td>9</td>
<td>M, 28</td>
<td>Veterinary student</td>
<td>Malaise, dry cough, fever, eosinophilic pneumonia</td>
<td>Erythromycin</td>
<td>None</td>
<td>2 months</td>
</tr>
<tr>
<td>10</td>
<td>M, 30</td>
<td>Sheep, raw milk ingestion</td>
<td>Axillary lymphadenopathy</td>
<td>Excision</td>
<td>Sinus tract</td>
<td>3 months</td>
</tr>
<tr>
<td>11</td>
<td>M, 18</td>
<td>Butcher</td>
<td>Cervical lymphadenopathy, malgas, arthralgias</td>
<td>Excision, drainage, erythromycin</td>
<td>Sinus tract, relapse of abscess</td>
<td>6 months</td>
</tr>
<tr>
<td>12</td>
<td>M, 29</td>
<td>Sheep rancher</td>
<td>Asymptomatic lymphadenopathy, tender epitrochlear lymphadenopathy, erythema, fever</td>
<td>Antibiotic</td>
<td>Sinus tract, secondary wound infection</td>
<td>8 months</td>
</tr>
<tr>
<td>Present case</td>
<td>M, 30</td>
<td>Butcher, sheep rancher</td>
<td>Tender epitrochlear and axillary lymphadenopathy</td>
<td>Excision, clarithromycin</td>
<td>Sinus tract, relapse of abscess</td>
<td>8 months</td>
</tr>
</tbody>
</table>

He had a leukocytosis of $11 \times 10^3 / L$ and a C-reactive protein of 10 mg/L. The day after admission, spontaneous discharge of the epitrochlear swelling occurred. Surgical drainage was performed. Because of the adjacent neurovascular bundle, full excision was precluded. The fluctuant axillary node was not excised. The culture of the pus and tissue samples again grew *C. pseudotuberculosis*, still susceptible to clarithromycin. Another 6-week course of oral clarithromycin was given. The wound healed within 4 weeks. Follow-up after 6 months revealed no signs of infection, and the patient was in good condition.

All five specimens from both surgical interventions grew pure cultures of anaerobic, Gram-positive coryneform rods which were non-motile, catalase-positive, fermentative and non-lipophilic. A conventional biochemical identification scheme and the API Coryne system (bioMérieux, la Balme-les-Grottes, France) showed acid production from glucose and maltose and hydrolysis of urea. Nitrate reduction, esculin hydrolysis and fermentation of sucrose, mannitol and xylose were negative. The identification of *C. pseudotuberculosis* was further supported by a reverse CAMP reaction and the analysis of the cellular fatty acid pattern by means of the Sherlock system (MIDI Inc., Newark, Del, USA). Disk diffusion sensitivity testing showed the organism to be susceptible to penicillin, amoxicillin, cefazolin, cefamandole, ceftriaxone, erythromycin and ciprofloxacin, but resistant to oxacillin and the aminoglycosides. MICs determined by E-test for clarithromycin, ampicillin and ciprofloxacin were <0.016 mg/L, 0.125 mg/L and 0.012 mg/L, respectively. These values did not differ between the isolates obtained at the first and the second operation. The biopsies showed granulomatous, necrotizing non-specific inflammation without signs of malignancy. In addition, there was...
infiltrates of eosinophilic granulocytes and focal inflammation with histiocytes, Langhans’ giant cells and epithelioid cell granulomas. Some areas showed marked infiltrates of eosinophilic granulocytes and focal necroses. No microorganisms could be detected.

In sheep and goats, C. pseudotuberculosis (formerly called C. ovis) commonly causes caseous lymphadenitis [7,12]. The disease is economically important, causing about a 5% shortfall in Australian wool production [12]. Lopez described the first human case in 1966 [1]. To our knowledge, only 13 cases have been published [1–11]. Eight of them were observed in Australia [2–6,10], two in the USA [7,9], and one each in Panama [1], France [8] and New Zealand [11]. Eight of them report close contact with sheep or work as a butcher [2–7,9,11,12]. The present case can be considered as imported from Turkey, and had a classical risk exposure of close contact with sheep.

All published cases had suppurative lymphadenitis (Table 1), except the one described by Keslin et al [7]. This patient had an eosinophilic pneumonia. He was a veterinary student who worked with C. pseudotuberculosis. He recovered with a 2 week course of erythromycin. Interestingly, our case, as well as some of the published ones, showed eosinophilic infiltrates in the histology of the lymph nodes.

In most of the published cases with suppurative lymphadenitis, prolonged courses with sinus formation and relapsing abscesses were the rule. Therefore, recurrent surgical interventions for drainage or excision were often required. In none of the cases was antibiotic therapy alone successful. This may be because C. pseudotuberculosis is a facultative intracellular pathogen multiplying in macrophages. It escapes the host defense and continues to multiply in the phagolysosomes [13,14]. Cell death and release of bacteria leads to necrotic lesions and to the formation of a thick collagen capsule [15]. Combination of surgery with antimicrobial therapy was successful in all published cases. A prolonged course of intracellularly active antibiotics is needed. In our case, a 2-week course was not long enough. Although C. pseudotuberculosis is susceptible to most antibiotics in vitro, the high intracellular concentration of newer macrolides may be advantageous.

This case demonstrates that in granulomatous lymphadenitis, Corynebacterium species should be considered as possible pathogens rather than contaminants. An eosinophilic infiltrate should suggest the possibility of infection due to C. pseudotuberculosis.

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