CASE REPORT

Necrotising pyomyositis complicating intramuscular antipsychotic administration

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SUMMARY

A 26-year-old woman with paranoid schizophrenia was admitted to the medical intensive care unit with septic shock requiring intubation and mechanical ventilation. The source of septic shock was not identified despite obtaining CT of the chest/abdomen/pelvis, bronchoalveolar lavage and microbiological results for tracheal secretions, blood, urine and cervix. An indium-111 tagged white cell count scan was subsequently performed, revealing increased right anterior deltoid uptake. Owing to serial increases (up to 1310 U/L) in serum creatine kinase and a history of local intramuscular paliperidone injections for management of schizophrenia, surgical exploration was performed and identified necrotising skeletal muscle inflammation and extensive fat necrosis with an organising abscess, consistent with pyomyositis. A gram stain of purulent fluid revealed gram-positive cocci, but no organisms grew in culture. The patient recovered after 10 days of daptomycin and 7 weeks of wound care. Paliperidone injections were discontinued and oral risperidone was initiated.

BACKGROUND

Intramuscular injection of medications, including non-steroidal anti-inflammatory drugs (NSAIDs), has been associated with rare cases of local skin and soft tissue infections. Our report illustrates a unique case of necrotising pyomyositis associated with intramuscular antipsychotic administration in a patient with schizophrenia.

CASE PRESENTATION

A 26-year-old woman with paranoid schizophrenia was previously non-compliant with daily oral antipsychotics and was, therefore, switched to a 3-month injectable formulation of paliperidone. She had been stable on this regimen for 2 years. After receiving her most recent intramuscular dose 3 days prior to presentation, she developed diffuse myalgias, chills and dizziness. After 1 week of worsening symptoms, she presented to the emergency department in septic shock, with fever of 38.7°C, tachycardia (127/min), tachypnoea (33/min), leucocytosis (14 500/mm³), hypotension (88/42 mm Hg) despite 30 mL/kg of rapid fluid bolus, and lactic acidosis (6.9 mmol/L). Physical examination revealed a lethargic, obese young female with no skin lesions or other localising signs of infection.

INVESTIGATIONS

As the source of septic shock was not identified, the patient underwent an extensive evaluation that included CT of the chest/abdomen/pelvis,

abdominal ultrasound, viral hepatitis serologies, bronchoalveolar lavage, and cultures from tracheal secretions, blood, urine and cervix. As these tests were all negative for a source of infection, an indium-111 tagged white cell count scan was subsequently performed, which showed increased uptake in the right anterior deltoid muscle (figure 1). Physical examination of the area was unremarkable, and the patient reported no shoulder pain. However, the examination was compromised by morbid obesity (body mass index 42); ultrasound of the area was negative, however. Owing to the serial increase in serum creatine kinase (1310 U/L)

Figure 1 Anteroposterior planar whole-body white cell count scan with imaging 24 h after radiotracer injection. There is focally increased uptake in the soft tissues about the anteromedial right shoulder, which likely is a site of infection.

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and a history of local intramuscular injections with paliperidone, surgical exploration was performed and identified necrotising inflammation in skeletal muscle and extensive fat necrosis with organising abscess in adjacent adipose tissue, consistent with pyomyositis. A gram stain of purulent fluid obtained from the surgical exploration revealed gram-positive cocci, but no organism was grown from bacterial cultures; the patient had received antibiotics for 12 days prior to the surgical procedure. Nasal screening for methicillin-resistant *Staphylococcus aureus* was negative, as were serum anti-DNase B and antistreptolysin O titres. A throat swab for *Streptococcus pyogenes* and 16S rRNA sequencing were not performed.

DIFFERENTIAL DIAGNOSIS

Myositis, pyomyositis, necrotising fasciitis, clostridial myonecrosis.

TREATMENT

The patient was intubated and on mechanical ventilation secondary to acute respiratory failure complicating septic shock. Vancomycin, piperacillin-tazobactam and levofloxacin were initiated. The patient required vasopressor support with nor-epinephrine and phenylephrine. Once a diagnosis of pyomyositis was confirmed on surgical exploration and initial gram stain revealed gram-positive cocci, antimicrobial therapy was switched to vancomycin and clindamycin. Owing to concerns of drug fever, vancomycin was discontinued, and daptomycin was initiated.

OUTCOME AND FOLLOW-UP

After a 25-day hospital stay, the patient required 7 weeks of physical therapy and wound care at a transitional care facility. She recovered over this period of time. Oral risperidone was initiated, and paliperidone injections were discontinued.

DISCUSSION

Intramuscular injection is a routine, safe method to administer medications. Local infections, including cellulitis, subcutaneous abscess and necrotising fasciitis are rare complications of intramuscular injection.¹ Past reports of complicating infections have mostly implicated intramuscular administration of NSAIDs, such as diclofenac. A 1995 report from South Africa highlighted three patients with extensive tissue necrosis and three patients with necrotising fasciitis due to intramuscular diclofenac administration. The causative organisms were *S. pyogenes*, *Escherichia coli* and *Enterococcus faecalis*.² Several cases have been complicated by septic shock, disseminated intravascular coagulation, adult respiratory distress syndrome and renal failure.²⁻⁴

The exact incidence of skin and soft tissue infections complicating intramuscular administration of NSAIDs is not known, as the literature has primarily contained scattered anecdotal case reports.⁵ Even less is known about the association between skin and soft tissue infection, and intramuscular antipsychotics. There has been a case report of myonecrosis and toxic shock-like syndrome due to group C, β -haemolytic streptococcus in a patient who received intramuscular prochlorperazine.⁶ However, such cases are rare, and intramuscular antipsychotics have become an important mode of medication administration for patients who have psychiatric disorders, such as schizophrenia and previous history of non-compliance with oral medications. Compared to daily oral antipsychotics, long-acting intramuscular formulations may improve medication compliance and outpatient functioning, and is cost-effective in the schizophrenic population.⁷

In past studies, there have been insufficient data to corroborate a cause-and-effect relationship between intramuscular administration of NSAIDs with necrotising fasciitis. However, possible mechanisms include inhibition of granulocyte adherence, activation, phagocytosis, cytokine production or masking of symptoms leading to delay in diagnosis. It is also possible that intramuscular administration of NSAIDs may cause the so-called 'Nicolau syndrome'. This is a rare phenomenon in which intramuscular administration of NSAIDs (as well as antihistamines, corticosteroids, local anaesthetics, penicillins, chlorpromazine, sulfonamides or vaccines) leads to penetration of microcrystals into a blood vessel, subsequent arterial embolism and local aseptic necrosis. This could potentially be complicated by secondary invasion with bacteria.⁵⁻⁸ Given the rarity of skin and soft tissue infections associated with intramuscular antipsychotic administration, there is scant information regarding the pathogenesis of infection.

Pyomyositis is defined as an intramuscular abscess of the large skeletal muscle groups. Though unclear, it is likely caused by transient bacteraemia in the setting of prior muscle injury, which exposes fibronectin-binding receptors on muscle cells and allows bacterial entry. Pyomyositis is classically a tropical disease, but it can be found in temperate areas, such as the USA, if the host is immunosuppressed due to HIV, malignancy, diabetes mellitus or haematological and rheumatological conditions.⁹ As of 2002, temperate pyomyositis had been reported in at least 20 cases of injection drug use.¹⁰ However, our patient did not possess any of the above risk factors. As our case report has strikingly illustrated, intramuscular antipsychotic injection is a predisposing factor for the development of pyomyositis that may not be readily appreciated. Although a definitive pathogen was not identified, local abscess formation and negative serum anti-DNase B, and antistreptolysin O titres indirectly suggest that *S. aureus* was the likely pathogen. Surgical debridement is crucial for source control in these cases.¹¹

Learning points

- ▶ Local infections, including cellulitis, subcutaneous abscess and necrotising fasciitis are rare complications of intramuscular injection.
- ▶ Temperate pyomyositis can be found in immunosuppressed hosts with HIV, malignancy, diabetes mellitus, haematological and rheumatological conditions.
- ▶ Intramuscular antipsychotic administration is a rare cause of temperate pyomyositis and should be considered as a source of septic shock.
- ▶ Surgical debridement or drainage is essential for optimal treatment of necrotising pyomyositis.

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REFERENCES

- 1 Hagiya H, Okita S, Kuroe Y, et al. A fatal case of streptococcal toxic shock syndrome due to *Streptococcus dysgalactiae* subsp. *equisimilis* possibly caused by an intramuscular injection. *Intern Med* 2013;52:397-402.

- 2 Pillans PJ, O'Connor N. Tissue necrosis and necrotizing fasciitis after intramuscular administration of diclofenac. *Ann Pharmacother* 1995;29:264–6.
- 3 Scharschmidt TJ, Weiner SD, Myers JP. Bacterial pyomyositis. *Curr Infect Dis Rep* 2004;6:393–6.
- 4 Eckmann C, Kujath P, Shekariz H, et al. [Clostridium myonecrosis as a sequelae of intramuscular injections—description of 3 fatal outcomes]. *Langenbecks Arch Chir Suppl Kongressbd* 1997;114:553–5.
- 5 Verfaillie G, Knappe S, Corne L. A case of fatal necrotizing fasciitis after intramuscular administration of diclofenac. *Eur J Emerg Med* 2002;9:270–3.
- 6 Korman TM, Boers A, Gooding TM, et al. Fatal case of toxic shock-like syndrome due to group C streptococcus associated with superantigen exotoxin. *J Clin Microbiol* 2004;42:2866–9.
- 7 Bhanji NH, Chouinard G, Margolese HC. A review of compliance, depot intramuscular antipsychotics and the new long-acting injectable atypical antipsychotic risperidone in schizophrenia. *Eur Neuropsychopharmacol* 2004;14:87–92.
- 8 Panariello L, Ayala F. Nicolau syndrome following intramuscular diclofenac injection: a case report. *Dermatol Ther* 2008;21(Suppl 1):S10–12.
- 9 Crum NF. Bacterial pyomyositis in the United States. *Am J Med* 2004;117:420–8.
- 10 Ebright JR, Pieper B. Skin and soft tissue infections in injection drug users. *Infect Dis Clin North Am* 2002;16:697–712.
- 11 Larkin JA, Shashy RG, Poblete SJP. Nontropical pyomyositis. *Hosp Physician* 1999;35:67–71.

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