

Spinal Injections in Immunosuppressed Patients and the Risks Associated with Procedural Care: To Inject or Not to Inject?

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Myth: Spinal injections in immunosuppressed patients have been proven to increase the incidence of periprocedural infections and complications.

Fact: There is no clear evidence of a causative effect between spinal injections and periprocedural infections and complications in immunosuppressed patients. However, there is a possibility that steroids can increase the infection risk and corticosteroid administration should be approached with caution in these patients.

Spinal injections for treatment of painful spine conditions are safe procedures when performed according to evidence-based guidelines [1].

While there have been numerous case reports of infections after epidural steroid injections (ESI), none have causally linked the infections to an immunosuppressed state in the described patients [2-11]. Most of these infections were attributable to contaminated injectate or poor infection control practices. The most serious ESI-related infections not linked to patient's immunosuppressed status occurred in 2012 when a multistate epidemic of parameningeal infections and infectious meningitis occurred after contaminated corticosteroids from a now-closed compounding pharmacy were unwittingly injected in hundreds of patients [12]. Overall the incidence of infections associated with spine procedures remains exceedingly low. Immunosuppressed patients could be considered at increased risk for infections.

Immunosuppression associated with biological agents and/or oral corticosteroids

Theoretically, the risk of infections is greater in immunosuppressed patients. Tumor necrosis factor inhibitors, such as infliximab have not shown an increased perioperative infection risk in the orthopedic literature [13,14]. High dose of oral glucocorticoid, but not infliximab, is an independent risk factor for perioperative infection [13]. Patients with supratherapeutic levels of infliximab have higher rates of hospitalizations for infections [15].

Periprocedural continuation of some traditional disease-modifying antirheumatic drugs appears to minimize the need for corticosteroid therapy for flares [16,17].

Immunosuppression secondary to an antiviral treatment -- infectious and non-infectious complications

Infectious complications can occur in immunosuppressed patients secondary to a viral infection or its treatment. Patients treated with peginterferon and ribavirin should have their complete blood count checked on a regular basis [18,19,20]. One may consider avoiding elective interventions in the first 12 weeks of therapy with an interferon-based regimen, given that this time period has the highest incidence of infections [21].

In a review of 14 cases of epidural abscess and/or meningitis attributed to ESI, twelve of the patients had positive cultures for *S. aureus* and eight were considered immunocompromised [2]. Prophylaxis for *S. aureus* could be considered for immunocompromised patients undergoing interventional spine procedures.

Non-infectious complications in immunosuppressed patients can occur in HIV-infected patients treated with protease inhibitors. The protease inhibitor Ritonavir is one of the most potent inhibitors of the P450 3A4 pathway, which also metabolizes glucocorticoids. This medication can significantly decrease or block the clearance of glucocorticoids causing major complications [22-24]. Less evidence is available about other protease inhibitors. These patients are at risk of developing hypothalamic-pituitary-adrenal (HPA) axis dysfunction and should be counseled regarding signs and symptoms of HPA-axis dysfunction prior to the procedure [25].

Immunosuppression associated with long-term suppression of host vs. graft disease in patients with solid organ transplants

Transplant patients on immunosuppression therapy are

prone to increased medical complications, in particular periprosthetic infections (OR 1.69, $p < 0.001$) compared to patients without solid organ transplants [26].

Immunosuppression secondary to therapy for malignancy

There is a scarcity of literature regarding the risk of infections in surgical cases or spine interventions for patients receiving chemotherapy for malignancy.

Discussion

There is a paucity of scientific studies addressing the risks posed by spinal injections in immunocompromised patients.

Exogenous corticosteroids can cause cortisol suppression. This effect is dependent on the type and dose of steroid used. Cortisol suppression may increase the risk for infections [27]. There is no absolute recommendation specific to spinal injections for patients receiving immunosuppressive treatments. There is little information regarding the optimal time to perform a procedure in relationship to the immunosuppressant doses. Immunosuppressed patients considered at risk should be identified by the spine interventionalist prior to treatment. Consultation with the prescribing physician and a thorough discussion with the patient may be warranted to discuss the optimal timing of a potential spinal injection in relationship to immunosuppressive drug administration.

Patients should be educated on the signs and symptoms of infection since early identification may help limit the risk of rare but serious sequelae, such as irreversible neurologic symptoms or possible death.

Conclusion

There is no clear evidence of a causative effect between spinal injections and periprocedural infections in immunosuppressed patients. There is a possibility that steroids can increase the infection risk in these patients and steroid administration should be approached with caution.

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