Introduction
We present an interesting case where a patient developed secondary adrenal insufficiency following multiple intra-articular steroid injections.

Methods
A 59-year-old woman presented with fatigue and 50 pounds weight gain in the last two years. She has been receiving triamcinolone steroid injections in both knees every three months for the last two years. She has also been receiving triamcinolone injections in ankles sporadically during this time period. Laboratory evaluation showed undetectable serum cortisol and inappropriately normal serum adrenocorticotropic hormone (ACTH). The patient underwent cosyntropin stimulation test confirming secondary adrenal insufficiency (Table 1). Magnetic resonance imaging (MRI) showed a normal pituitary gland with no tumors. She was started on hydrocortisone 10mg twice daily with improvement in fatigue. The patient was recommended to minimize steroid injections. The plan is to taper steroid subsequently.

Table 1. Laboratory studies

<table>
<thead>
<tr>
<th>ACTH level</th>
<th>AM Cortisol</th>
<th>After 30 minutes</th>
<th>After 60 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>6pg/ml</td>
<td>&lt;1mcg/dl</td>
<td></td>
</tr>
<tr>
<td>Cosyntropin Stimulation</td>
<td>0.6mcg/dl</td>
<td>3.8 mcg/dl</td>
<td>5.1mcg/dl</td>
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Discussion
Secondary adrenal insufficiency (SAI) is the decrease in adrenal glucocorticoid production due to dysfunction in the hypothalamic-pituitary-adrenal (HPA) axis. The most common cause of SAI is exogenous glucocorticoid administration, and is dependent on dosage, amount, and duration. SAI can be seen as early as three weeks after administration of high doses of corticosteroids and symptoms can occur within 48 hours of withdrawal. The HPA axis can take up to 18 months or longer to recover. Clinicians are relatively familiar with the risk of secondary adrenal insufficiency (SAI) with the use of high dose systemic glucocorticoids. The occurrence of symptomatic SAI following glucocorticoid joint injections is less well known. Studies have shown systemic absorption of steroid following a single joint injection leading to decreased serum cortisol production.\(^2\) The risk factors of axis suppression include multiple joints injection, split dosage, and higher doses of steroid. The reports of clinically significant AI secondary to intra-articular joint injections are rare, but there are case reports of emergent manifestations in both the pediatric and adult population.\(^3\)\(^4\) There are currently no well established guidelines for frequency of intraarticular joint injections.\(^5\)

Conclusion
This case highlights that intraarticular steroid injections do have systemic adverse effects and the need for more awareness among clinicians. This case supports the need for further evaluation of the risks of SAI with the number of joint injections, the frequency of injections, and the time interval between multiple intraarticular steroid injections.

References