Research letter

# Osteonecrosis of the femoral head in men following short-course corticosteroid therapy: a report of 15 cases

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Osteonecrosis has long been recognized as a complication of systemic steroid use and was initially believed to occur only in patients who received high doses (equivalent to more than 4000 mg of prednisone) for extended periods (3 months or longer).[1–6] Previous sporadic case reports have described patients in whom osteonecrosis developed following relatively brief courses (7 days) of low-dose, orally administered steroid medication.[7–11] The exact mechanism by which these medications cause osteonecrosis remains elusive.[1,3,5,7,12,13] Current research has focused on the development of a hypercoaguable state, with subsequent impaired fibrinolysis and venous thrombosis in bone.[14,15]

At a tertiary care, university-affiliated orthopedic unit specializing in the treatment of osteonecrosis of the femoral head, we reviewed the charts of patients who presented from 1986 to 1996 with osteonecrosis of the femoral head who had received a single short-course of corticosteroid medication within the 3 years before presentation (Table 1). We identified 15 patients who met the inclusion criteria. An exhaustive examination for other potential risk factors revealed only 3 patients with such factors; none of these risk factors was felt to be sufficient, in isolation, to cause osteonecrosis.[13–21]

All 15 patients were male. Their mean age was 32.2 (range 20–41) years. The mean steroid dose in equivalent milligrams of prednisone was 850 (range 290–3300) mg. The mean duration of drug therapy was 20.5 (range 7–39) days. The mean time from administration of steroids to the development of hip symptoms was 16.6 (range 6–33) months. There was significant diagnostic delay in the ma-

**Table 1: Characteristics of 15 patients with osteonecrosis of the femoral head following short-course corticosteroid therapy**

| Case | Age, yr | Indication for steroid therapy* | Duration of therapy, d | Dose, mg† | Other medical conditions | Time from therapy to hip pain, mo |
|---|---|---|---|---|---|---|
| 1 | 38 | Pneumonia | 20 | 550 | None | 7 |
| 2 | 35 | Brain abscess | 6 | 435 | Recurrent otitis media | 8 |
| 3 | 33 | Aneurysm | 26 | 3300 | Alcoholism | 16 |
| 4 | 34 | Bells palsy | 36 | Unknown | None | 31 |
| 5 | 30 | Asthma | 39 | 1050 | Asthma | 6 |
| 6 | 36 | Arthralgia | 20 | 620 | Type 2 diabetes mellitus | 28 |
| 7 | 34 | Migraine | 20 | 700 | Migraine | 12 |
| 8 | 26 | Poison ivy | 21 | 660 | None | 8 |
| 9 | 32 | Poison ivy | 14 | 560 | None | 11 |
| 10 | 35 | Poison ivy | 7 | 290 | Alcoholism | 23 |
| 11 | 21 | Mononucleosis | 14 | 620 | None | 12 |
| 12 | 20 | Optic neuritis | 28 | 840 | Hip dislocation | 33 |
| 13 | 36 | Pneumonia | 14 | 700 | None | 9 |
| 14 | 32 | Optic neuritis | 28 | 900 | None | 16 |
| 15 | 41 | Bee sting | 14 | 700 | None | 29 |

*Prednisone was prescribed in 13 cases and dexamethasone in 2.
†Doses are listed in equivalent milligrams of prednisone.

jority of cases, such that symptoms had often been present for many months or years before referral. All of these patients subsequently required surgical intervention.

A potential criticism of our study is that the osteonecrosis seen in our patients may have been either idiopathic or associated with some other (as yet unknown) precipitating factor. Although this is possible, we think that the number of cases in this series provides a strong link between steroid administration and the subsequent development of osteonecrosis in these patients. We do not, however, attempt to define the incidence of this complication, because the total patient population who received steroid medication from which our patients were identified remains unknown.

Osteonecrosis of the femoral head is a condition with a poor natural history that can be crippling, especially in young active patients. Our series does not provide conclusive proof that there is a cause–effect relation between short-course steroid therapy and osteonecrosis. However, the number of patients seen with this condition in our unit is strong presumptive evidence that some association exists. When weighing the risks and benefits of the use of steroid medication, especially in self-limited diseases or those for which steroids are of dubious benefit, clinicians should be aware of this potential problem. Patients should be informed of the potential risk of osteonecrosis following the use of steroid medication. Complaints of hip pain in people who have previously been prescribed steroids should produce a high index of suspicion for underlying osteonecrosis of the femoral head. Although early treatment before collapse of the femoral head occurs is beneficial,[22] prevention of this complication is preferable.

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