Avascular necrosis of the femoral head following intra-articular cortisone injection

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INTRODUCTION: The relationship between systemic corticosteroids and the risk of femoral head avascular necrosis (AVN) is well-established. However, little is known about the risk of AVN following intra-articular steroid injection. An apparent increase in rapidly progressive AVN in patients who received one or more intra-articular steroid injections has been noted at a large Canadian arthroplasty center. A study was undertaken to determine the rate and progression of AVN and osteoarthritis (OA) of the hip following intra-articular steroid injection.

METHODS: A retrospective chart review was undertaken of a random sample of the adult population who received an intra-articular hip steroid injection in a major Canadian city between 2010 and 2015 (n=9266). Subjects were included if they had radiographs of the hip or pelvis within 2 years prior to and 15 months following the injection, and were excluded if they had previous hip surgery or previous injection within 2 years. Prevalence and severity of AVN and OA prior to and following injection were determined by pre- and post-injection radiograph analysis using the Ficat and Kellgren-Lawrence staging systems, respectively.

RESULTS: In total, 1,569 events were reviewed and 433 met inclusion criteria. Some degree of AVN was seen prior to injection in 16.6% (n=72), which increased to 46.7% (n=202) within 15 months following injection. Progression of OA was seen in 67% (n=290). Over half of the subjects (52.8%, n=229) underwent total hip arthroplasty within two years of hip injection.

DISCUSSION AND CONCLUSION: These results demonstrate a high rate of the development and progression of hip AVN as well as the progression of radiographic OA within 15 months of corticosteroid injection of the hip joint. Further study is required to establish a causal relationship but the routine use of steroid injection in the management of hip arthritis should be approached with caution.

Figure 1A Radiograph taken 3 weeks prior to steroid injection

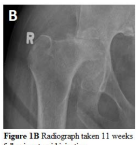

Figure 1B Radiograph taken 11 weeks following steroid injection

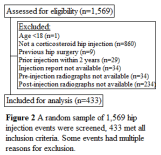

Figure 2 A random sample of 1,569 hip injection events were screened, 433 met all inclusion criteria. Some events had multiple reasons for exclusion.

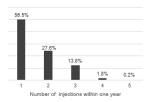

Figure 3 Proportion of included subjects who received only one (index) or multiple hip injections within one year following the index injection.

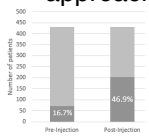

Figure 4 Prevalence of avascular necrosis on pre-injection and post-injection radiographs.

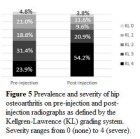

Figure 5 Prevalence and severity of hip osteoarthritis on pre-injection and post-injection radiographs as defined by the Kellgren-Lawrence (KL) grading system. Severity ranges from 0 (none) to 4 (severe).

Table 1 Steroids and doses administered for included intra-articular hip injections.

Steroid	N	%
Triamcinolone 40mg	311	71.8%
Methylprednisolone 40mg	50	11.5%
Methylprednisolone 80mg	62	14.3%
Other	6	1.4%