



Q/ Do intra-articular steroid injections affect glycemic control in patients with diabetes?

Erin Kallock, MD;
Jon O. Neher, MD
Valley Family Medicine
Residency, Renton, Wash.

Leilani St. Anna, MLIS, AHIP
University of Washington
Health Services Library, Seattle

EVIDENCE-BASED ANSWER

A/ YES, BUT THE CLINICAL IMPORTANCE IS MINIMAL. A single intra-articular steroid injection into the knee produces acute hyperglycemia for 2 or 3 days in patients with diabetes who otherwise have good glucose control (strength of recom-

mendation [SOR]: **B**, small cohort studies).

Intra-articular steroid injections into the shoulder may briefly raise postprandial (but not mean) glucose levels with larger and repeated doses (SOR: **C**, extrapolated from heterogeneous and mixed cohort studies).

Evidence summary

Two prospective cohort studies evaluated the effect on glycemic control of a single glucocorticoid injection into the knee of patients with controlled type 2 diabetes (glycosylated hemoglobin A1c <7.0%). The first enrolled 9 patients with symptomatic osteoarthritis of the knee unresponsive to 3 months of nonsteroidal anti-inflammatory drugs (NSAIDs).¹ All received a 50-mg injection of methylprednisolone acetate after maximal aspiration of any joint fluid. No changes were made to the diabetes care regimen, including medication, diet, or exercise prescriptions.

With self-monitoring 6 times a day during the week after the injection, 7 patients showed an increase over baseline blood glucose levels of more than 2 standard deviations; values typically rose above 300 mg/dL. Peak blood sugar elevation occurred 5 to 84 hours after injection; the hyperglycemic effect lasted for 2 or 3 days.

In a second cohort study, 6 patients received a knee injection of 1 mL Celestone Chronodose (3 mg betamethasone acetate and 3 mg betamethasone sodium phosphate, comparable in anti-inflammatory and glucocorticoid potency to 32 mg methylprednisolone acetate).² Patients monitored their blood glucose 6 times a day for

1 week; investigators measured fructosamine levels (a measure of intermediate-term glucose control) at baseline and again 2 weeks after injection.

The injection produced hyperglycemia in all participants, with peak blood glucose levels ranging from 251 to 430 mg/dL and time to peak glucose usually less than 6 hours. Fructosamine levels didn't change significantly.

No change in glucose after a single shoulder injection

Two studies evaluated the effect of a single shoulder injection. One prospective cohort study included 18 patients with diabetes (type not specified, mean A1c=7.6%).³ All had shoulder pain unresponsive to NSAIDs for more than a month, had not changed diabetes medications within the preceding 2 weeks, and had not had steroid therapy within the preceding 3 months.

All patients received a single injection containing 35 mg methylprednisolone acetate into the anterior glenohumeral joint. They monitored their blood glucose levels 6 times a day for 1 week and had a fructosamine level drawn before injection and 2 weeks afterward. The injection produced no significant change in mean blood glucose or fructosamine levels.

CONTINUED



A single steroid injection into the knee joint causes acute hyperglycemia for 2 or 3 days in patients with diabetes who otherwise have good glucose control.

CLINICAL INQUIRIES

But repeated shoulder injections raise postprandial glucose

In contrast, another prospective cohort study followed 11 patients (8 with diabetes) who received 3 injections of 3.75 mg cortivazol (comparable to 50 mg methylprednisolone acetate) at 3-day intervals into 1 shoulder joint.⁴ Investigators checked fasting and postprandial glucose levels before the first injection and on post-treatment days 1, 7, and 21.

The shoulder injections elevated postprandial glucose levels (from 170±60 mg/dL at baseline to 258±100 mg/dL on

day 1 and 252±87 mg/dL on day 7; $P<.05$ for both comparisons). Mean fasting glucose levels didn't change, however.

Recommendations

The American Academy of Orthopedic Surgeons treatment guidelines for osteoarthritis of the knee don't discuss possible adverse effects from steroid injections.⁵ The American Diabetes Association makes no recommendations regarding steroid injections in patients with diabetes. **JFP**

References

1. Habib GS, Bashir M, Jabbar A. Increased blood glucose levels following intra-articular injection of methylprednisolone acetate in patients with controlled diabetes and symptomatic osteoarthritis of the knee. *Ann Rheum Dis*. 2008;67:1790-1791.
2. Habib G, Safia A. The effect of intra-articular injection of beta-methasone acetate/betamethasone sodium phosphate on blood glucose levels in controlled diabetic patients with symptomatic osteoarthritis of the knee. *Clin Rheumatol*. 2009;28:85-87.
3. Habib GS, Abu-Ahmad R. Lack of effect of corticosteroid injection at the shoulder joint on blood glucose levels in diabetic patients. *Clin Rheumatol*. 2007;26:566-568.
4. Younes M, Neffati F, Touzi M, et al. Systemic effects of epidural and intra-articular glucocorticoid injections in diabetic and non-diabetic patients. *Joint Bone Spine*. 2007;74:472-476.
5. American Academy of Orthopaedic Surgeons. Treatment of osteoarthritis of the knee (non-arthroplasty). Available at: www.aaos.org/research/guidelines/OAKguideline.pdf. Accessed July 2, 2009.

Clinician Reviews

A peer-reviewed journal dedicated to keeping Nurse Practitioners and Physician Assistants up-to-date in clinical practice and important trends in health care delivery.

- CME/CE article
- Intriguing self-assessment quizzes
- Interviews with PA and NP thought leaders
- Malpractice Chronicle



➤➤➤ NOW AVAILABLE Clinician Reviews Digital Edition



Digital Edition Advantages

- Live Web and E-mail links
- Send articles to colleagues or share them on Facebook, Twitter, and LinkedIn
- Browse the entire issue
- Create an electronic library
- Link directly to the CME/CE test
- Download a mobile version

➤➤➤ Look for our new enhanced Web site in 2011 www.clinicianreviews.com