trolled trial. BMJ. 2006;332:325-9. [PMID: 16439370]
3. Leizorovicz A, Cohen AT, Turpie AG, Olsson CG, Vaitkus PT, Goldhaber SZ; PREVENT Medical Thromboprophylaxis Study Group. Randomized, placebo-controlled trial of dalteparin for the prevention of venous thromboembolism in acutely ill medical patients. Circulation. 2004;110:874-9. [PMID: 15289368]

Open Notes: Sharing Physician Notes With Patients

TO THE EDITOR: I read with great interest Delbanco and colleagues' article (1) on sharing doctors' notes electronically with patients. In April 2007, the office in which I practice went live with our electronic health record, and we realized that writing outpatient instructions no longer made sense. For years, many of us had dictated notes in front of patients. So, at the noon meeting on the day we went live, we decided to give patients a copy of their notes at discharge, even though the notes contained a great deal more information than just instructions.

Using voice-recognition software, we dictate the assessment, the orders, and any instructions before the patient leaves the room, and we often complete the notes before the patient arrives at checkout. The sky has not fallen. Patient comments have been uniformly positive. Calls have decreased, rather than increased. The calls we have received have moved to "my 'brother-in-law' has diabetes, not my 'brother,'" replacing "I forgot how he told me I was supposed to take the stomach pill." Patients have corrected errors in their record that would otherwise have gone uncorrected. Calls of confusion and panic have simply not materialized. In cross-coverage, we find each other's notes more understandable, perhaps because they were dictated with the patient-reader in mind.

In writing to patients, we write notes that are worth reading. I am glad to see this formally studied, but my office already knows what the answer will be.

R. Hal Baker, MD
WellSpan Health
York, PA 17403

Potential Conflicts of Interest: None disclosed.

Reference

1. Delbanco T, Walker J, Darer JD, Elmore JG, Feldman HJ, Leveille SG, et al. Open notes: doctors and patients signing on. Ann Intern Med. 2010;153:121-5. [PMID: 20643992]

TO THE EDITOR: Sharing notes with our patients, as discussed by Delbanco and colleagues (1), is an important component in implementing the collaborative model of health care. I share my "problem list" as part of a summary I provide some new patients and include it in the after-visit summary given to all patients at the end of the appointment. To date, I have not received any negative feedback, including any about the sharing of a patient's mental health problems. The most frequent patient response is to clarify details and to correct any errors. I find this mutually advantageous for the reasons outlined in Delbanco and colleagues' article. I am confident the "open note" electronic record initiative will gain wide acceptance.

David A. Nardone, MD
Portland Veterans Affairs Medical Center
Portland, OR 97239

Potential Conflicts of Interest: None disclosed.

Reference

1. Delbanco T, Walker J, Darer JD, Elmore JG, Feldman HJ, Leveille SG, et al. Open notes: doctors and patients signing on. Ann Intern Med. 2010;153:121-5. [PMID: 20643992]

Observation

Creatine Supplementation Prevents Statin-Induced Muscle Toxicity

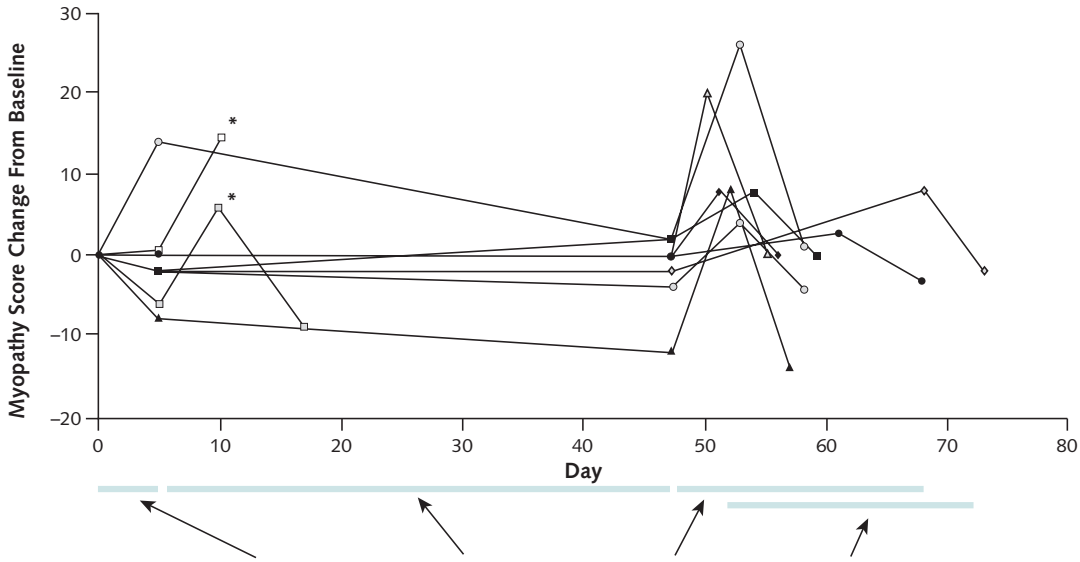
Background: Muscle toxicity is the most important adverse effect of 3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitors (statins). The incidence of statin-induced myopathy is debated, depending in part on whether the milder and more common symptoms of muscle ache, weakness, and cramping are part of a continuum that also includes rhabdomyolysis, renal failure, and death. Although creatine kinase (CK) elevation is a marker of injury often used clinically to follow the severity of statin-induced myopathy, it has limited usefulness for defining statin-induced myopathy. For example, muscle-toxicity symptoms and biopsy evidence of mitochondrial dysfunction without CK elevation have been documented during statin therapy (1). In addition, statins exaggerate normal CK elevations that occur with exercise, which can happen without symptoms.

Glucocorticoid therapy causes myalgia in the absence of CK elevation that is associated with an elevated urinary creatine–creatinine ratio (2), which has also been seen in statin-induced myopathy. Stable serum creatine concentration is maintained by a negative-feedback mechanism, and for a given level of renal function, serum creatinine is largely a reflection of intramuscular creatine stores. We, therefore, postulated that a high urinary creatine–creatinine ratio indicates a deficiency in intramuscular creatine.

Objective: To determine whether creatine supplementation would diminish the severity of statin-induced myalgia, weakness, and cramping.

Methods: We conducted an open-labeled case series of creatine supplementation in 12 patients with known intolerance to at least 3 statins, and we created controls by starting, withdrawing, and restarting creatine treatment during statin therapy. We calculated a patient's myopathy score after each change in therapy by assessing myalgia, weakness, and cramping on visual analog scales (score range, 0 to 10) and subtracting the sum of these 3 values from the sum at baseline. Creatine was supplied as a monohydrate powder (Performance Plus, Tigard, Oregon), and patients took each dose (dosages varied between treatment phases) with 250 mL of water. We assessed myopathy scores at baseline, after 5 days of creatine loading, after 6 weeks of statin plus maintenance-dose creatine therapy, after statin therapy alone until patients reported muscle symptoms, and after 5 days of statin therapy plus creatine reloading (**Figure**). We used the Wilcoxon matched-pairs signed-rank test (2-tailed) to measure the statistical significance of changes from baseline to the end of each treatment phase for the myopathy score, vital signs (blood pressure

Figure. **Changes in myopathy score from baseline over time in 10 of the 12 patients.**



Treatment†	Creatine Loading	Creatine Maintenance Plus Statin	Statin Only	Creatine Reloading Plus Statin
Mean myopathy score (SD)	–0.7 (5.0)	0.6 (6.7)	10.6 (8.1)	–3.7 (4.9)
P value‡	NS	NS	<0.05	NS

Two patients were removed from the study during the loading dose of creatine, before statin therapy: 1 had shoulder pain (shown to be arthritis), and 1 had chest pain and worsened hypertension (possible nonadherence to therapy). Both had negative cardiac stress test results. The myopathy score is the difference, expressed as mean (SD), from baseline in the sum of 3 patient-reported scores on a visual analog scale (range, 0 to 10) for muscle-toxicity symptoms of ache, weakness, and cramping. NS = not significant.

* Two patients reported symptoms during the creatine maintenance plus statin treatment phase: 1 withdrew from the study, and the other was given creatine reloading while statin therapy continued.

† Treatment was creatine, 5 g twice daily, for 5 d (creatine loading); creatine, 5 g/d, with statin for 6 wk or until onset of muscle-toxicity symptoms (creatine maintenance plus statin); statin only until onset of muscle-toxicity symptoms (statin only); and creatine, 5 g twice daily, with continued statin therapy for 5 d (creatine reloading plus statin).

‡ *P* values for Wilcoxon matched-pairs signed-rank test (2-tailed).

and heart rate), and laboratory test results for adverse outcomes (blood urea nitrogen, creatinine, CK, alanine aminotransferase, and alkaline phosphatase levels).

Findings: Myopathy scores were significantly higher after the statin-only treatment phase than at baseline but did not differ from baseline after the other treatment phases. Creatine loading plus maintenance creatine therapy prevented myopathy symptoms in 8 of 10 patients receiving statins. After these 8 patients stopped maintenance creatine therapy and developed myopathy symptoms while receiving statins alone, reloading creatine decreased symptoms to baseline levels. Also, increasing the creatine dosage from maintenance to loading diminished myopathy symptoms to baseline levels in 1 patient who developed symptoms 6 days after a statin was added to maintenance creatine therapy. No significant differences in vital signs or laboratory test results were observed.

Discussion: Our data support the hypothesis that decreased intramuscular creatine could be involved in the mechanism of statin-induced muscle toxicity. This hypothesis is plausible because in the creatine shuttle model, creatine is the kinetically limiting acceptor that controls respiration (3). Thus, diminished intramuscular creatine could impair mitochondrial respiration, which has been supported by histologic evidence, respiratory exchange ratios, and lactate–pyruvate levels in patients receiving statins (4). Cyclosporine causes a similar myopathy syndrome by diminishing the availability of creatine transporter at the muscle cell surface (5). We propose that statins, high-dose glucocorticoids, and cyclosporine share a muscle-toxicity syndrome associated with decreased intracellular creatine in muscle. We also propose that a more complete model of statin muscle toxicity might be developed by integrating the effects of statins on creatine physiology with findings involving coenzyme Q10 depletion, endoplasmic reticulum stress, the unfolded protein response, and apoptotic signaling.

David A. Shewmon, MD
Cleveland Clinic Foundation
Wooster, OH 44691

John M. Craig, BA
Johns Hopkins Bloomberg School of Public Health
Baltimore, MD 21205

Potential Conflicts of Interest: None disclosed.

References

1. Phillips PS, Haas RH, Bannykh S, Hathaway S, Gray NL, Kimura BJ, et al; Scripps Mercy Clinical Research Center. Statin-associated myopathy with normal creatine kinase levels. Ann Intern Med. 2002;137:581-5. [PMID: 12353945]

2. Askari A, Vignos PJ Jr, Moskowitz RW. Steroid myopathy in connective tissue disease. Am J Med. 1976;61:485-92. [PMID: 973643]

3. Meyer RA. A linear model of muscle respiration explains monoexponential phosphocreatine changes. Am J Physiol. 1988;254:C548-53. [PMID: 3354652]

4. De Pinieux G, Chariot P, Ammi-Saïd M, Louarn F, Lejonc JL, Astier A, et al. Lipid-lowering drugs and mitochondrial function: effects of HMG-CoA reductase inhibitors on serum ubiquinone and blood lactate/pyruvate ratio. Br J Clin Pharmacol. 1996;42:333-7. [PMID: 8877024]

5. Tran TT, Dai W, Sarkar HK. Cyclosporin A inhibits creatine uptake by altering surface expression of the creatine transporter. J Biol Chem. 2000;275:35708-14. [PMID: 10964923]