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Assessment of risk and use of prophylaxis for glucocorticoid-induced osteoporosis among dermatologists in the Pacific Northwest: a survey study

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Abstract

Objective: There currently exists a wide variation in clinician approach to the assessment and management of glucocorticoid-induced osteoporosis (GIO). Our objectives were to characterize Pacific Northwest dermatology providers' general practices, assessment of risk for GIO, and preferred GIO prophylaxis measures by way of survey. To identify whether knowledge deficits exist with respect to preventing and managing GIO in dermatology patients.

Design: A self-administered, 22-question survey was sent electronically to respondents. Surveyed population composed of 392 dermatology providers of the Washington State Dermatology Association and Oregon Dermatology Society registries. Survey responses were collected anonymously via Catalyst WebQ.

Results: Respondents over-estimated fracture risk and reported they would prescribe antiresorptive medications at a less-than-adequate rate. When given clinical scenarios and asked to assess risk of major osteoporotic fracture, respondents frequently overestimated risk compared to that estimated by the FRAX tool (67%-71%). When asked directly if one would prescribe bisphosphonates as GIO prophylaxis for a high-risk patient, only 49% responded always/almost always.

Conclusions: This study suggests that a knowledge deficit exists within dermatology with respect to prevention and screening of GIO. Provider variability in practices suggests that dermatology could benefit from additional education in assessment and treatment of GIO, as well as a clear set of guidelines for GIO management.

Keywords: glucocorticoid-induced osteoporosis, survey, risk assessment, quality improvement, guidelines

Introduction

Glucocorticoids are used for a number of dermatologic disorders, from atopic dermatitis to autoimmune blistering disorders. By increasing bone resorption and inhibiting bone formation, systemic glucocorticoids lead to glucocorticoid-induced osteoporosis (GIO) and fractures. During the first 6-12 months of glucocorticoid therapy, bone loss occurs, and as the steroid course continues, bone formation is impaired [1]. Exposure to even physiologic doses of glucocorticoids and doses as low as 2.5 mg per day can reduce one's bone mass and increase risk for osteoporotic fracture, with the daily glucocorticoid dose potentially more important than the cumulative dose received [2].

There currently exists a wide variation in clinician approach to the assessment and management of GIO. Accurate assessment of a patient's risk for osteoporotic fracture requires awareness of GIO and knowledge of the tools available to assess GIO risk. The Fracture Risk Assessment Tool (FRAX, http://www.shef.ac.uk/FRAX/tool.jsp), developed by the World Health Organization is a simple way for clinicians to measure a patient's risk for osteoporotic fracture based on risk factors such as glucocorticoid use, race, age, sex, weight, height, previous fracture, family history, smoking, and alcohol use. If a patient is determined to be at high risk of osteoporotic fracture, there are various prophylactic treatments for preventing GIO that the dermatologist may consider

in addition to calcium and Vitamin D, particularly the use of bisphosphonates or teriparatide. Although several studies have provided evidence supporting the use of bisphosphonates in preventing GIO in dermatology patients, dermatology practice in this area varies [2, 3]. Liu et al. followed 35 dermatology patients on long-term, high-dose prednisone or equivalent and found that 80% did not go on appropriate prophylaxis with bisphosphonate therapy despite their high risk for GIO [4]. Many dermatology patients may be undertreated.

We present the results of a survey study sent to dermatology care providers in Washington and Oregon states with a primary goal of identifying whether knowledge deficits exist with respect to preventing and managing GIO in dermatology patients.

Methods

A survey was sent electronically to 392 dermatology providers of the Washington State Dermatology Association and Oregon Dermatology Society registries. Participants were recruited by requesting access to member email address lists from the Washington State Dermatology Association and Oregon State Dermatology Society. Ethics approval was granted by the University of Washington and Oregon Health and Science University Institutional Review Boards. The 22 question survey was self-administered. Survey responses were collected anonymously via Catalyst WebQ.

Survey questions gathered basic demographic information and addressed dermatology practitioners' management of oral steroids and GIO. Situational scenarios were described and respondents were asked to make a selection reflecting their general practices, assessment of risk for GIO and preferred GIO prophylaxis measures. Respondents' estimation of patient risk for GIO (low, medium, high) was compared to that determined by the FRAX for each clinical scenario.

Results

Of the 392 dermatology providers sent the survey, 51 (13%) were completed; 84% of these were board certified to practice dermatology in the US. Twelve percent of respondents were Physician Assistant or Nurse Practitioners. Four percent were dermatology residents. The respondents described their practice settings as urban community group practice (45%), academic practice (23.5%), solo (23.5%), rural community group practice (6%) and other (1%). The majority of respondents report practicing dermatology for greater than 6 years (>80%).

Survey questions and results are outlined in **Table 1**. The majority of respondents did not report prescribing moderate or high dose chronic steroids (≥20mg/day prednisone or equivalent for ≥2 months), with 55% reporting prescribing this fewer than 5 times in the past year and 37% never. Only half reported prescribing chronic lower dose steroids (>7.5mg/day prednisone or equivalent for ≥3 months).

In addition, 98% of survey responders reported that they have never or almost never used the FRAX tool to assess for osteoporotic risk. Fifty three percent never/almost never recommend dual X-ray absorptiometry (DEXA) scanning prior to or after initiating glucocorticoids. When DEXA scan is determined necessary prior to initiating glucocorticoids, 59% elect primary care providers and 16% elect themselves to interpret the results. The majority (>70%) report they would prescribe/recommend calcium and Vitamin D supplementation for patients on long-term glucocorticoid therapy. Sixty one percent elect the primary provider to prescribe anti-resorptive agents when necessary.

When given clinical scenarios and asked to assess risk of major osteoporotic fracture, respondents frequently over-estimated risk compared to that estimated by the FRAX tool (67%-71%). Specifically, 94% accurately identified a high-risk female with multiple risk factors and 80% correctly identified bisphosphonates as appropriate GIO prophylaxis when given a high-risk scenario. However, when asked directly if one would prescribe bisphosphonates as GIO prophylaxis for a high-risk patient, only 49% responded always/almost always.

Discussion

Oral glucocorticoids remain an important treatment option for dermatologists. Glucocorticoids are critical in treatment and even life-saving for conditions such as autoimmune blistering diseases, pyoderma

gangrenosum, systemic lupus erythematosus and vasculitis. Patients requiring prolonged (>2 mo) glucocorticoids, even at low doses (>2.5 mg/day), are at risk for GIO; 30-50% of chronic glucocorticoid users develop a fracture [2, 5]. Hip fractures alone impact one-year mortality in an excess of 8.4-36% [6]. For these reasons, GIO must be considered by all dermatologists prescribing any dose of systemic glucocorticoids.

The American College of Rheumatology (ACR) issued a set of recommendations for managing GIO, using the FRAX as an indicator of 10-year risk for osteoporotic fracture [7]. We found that respondents were not utilizing validated tools to help manage patients at risk for GIO. The FRAX tool was used rarely despite its potential power in incorporating multiple patient variables to estimate risk for GIO. Baseline DEXA scans were also rarely obtained and most respondents considered primary care providers to be responsible for ordering and following DEXA studies. Regarding this, we propose that the responsibility to screen for and manage possible side effects from systemic glucocorticoids should fall on the prescriber unless there is a clear discussion and agreement with the primary care provider regarding the management of GIO.

Despite over-estimating fracture risk, respondents in our survey study under-prescribe anti-resorptive medications, which we identify as a practice gap in dermatology. We speculate that this highlights inadequate training surrounding assessment of GIO risks and the use of anti-resorptive medications in this specialty. Unfamiliarity with prescribing anti-resorptive medications and over-estimation of rare side effects such as jaw necrosis and atypical femur fractures may also contribute to underuse.

The dermatologic diseases treated by glucocorticoids are rare, and in our study, only a minority of dermatology providers reported prescribing prolonged or high-dose oral glucocorticoids. The general practices of surveillance, prophylaxis, and management of bone health was variable. It is possible that a lack of experience in managing glucocorticoids allows for a disparity in clinical knowledge of GIO, which in turn can increase risk of osteoporosis, fracture, and subsequently mortality for patients.

This study is one of the first to characterize dermatologists' practical management of GIO. Although we surveyed a larger group, limitations of our study include small sample size, responder bias, and potential sampling error. Unfortunately, we do not have the demographic data of those who did not respond, so differences in responses of survey participants versus non-responders are unknown.

Conclusion

This study suggests that a knowledge deficit exists within dermatology with respect to prevention and screening of GIO. The resultant practice gap is likely contributing to morbidity and mortality for dermatology patients requiring chronic glucocorticoid use for dermatologic disorders. Provider variability in practices suggests that dermatology could benefit from additional education in assessment and treatment of GIO, as well as a clear set of guidelines for GIO management.

Guidelines for managing GIO similar to those proposed by the ACR have not yet been implemented among US dermatologists. We propose that until similar guidelines are adopted within dermatology, the ACR guidelines for GIO be used by dermatology providers prescribing systemic glucocorticoids.

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Table 1. *Survey questions and results*

How frequently do you use the FRAX (World Health Organization Fracture Risk Assessment Tool) to assess for osteoporotic risk?	98.04% Never/almost never 0% Once in a while 1.96% Sometimes 0% Often 0% Always or almost always
How frequently do you recommend obtaining a dual X-ray absorptiometry (DEXA) scan prior to or soon after initiating glucocorticoids (if prescribing ≥5mg/day for ≥3 months)?	52.94% Never/almost never 11.76% Once in a while 13.73% Sometimes 13.73% Often 7.84% Always or almost always
How frequently do you prescribe or recommend calcium supplementation for patients who are on long-term glucocorticoid treatment (>6 mo)?	5.88% Never/almost never 3.92% Once in a while 3.92% Sometimes 15.69% Often 70.59% Always or almost always
How frequently do you prescribe or recommend Vitamin D supplementation for patients who are on long-term glucocorticoid treatment (>6 mo)?	52.94% Never/almost never 1.96% Once in a while 3.92% Sometimes 15.69% Often 70.59% Always or almost always
You are caring for an 82 year-old man who drinks four 12-ounce beers per day, has no history of fracture and is not currently taking glucocorticoids. You prescribe long term, moderate-high dose glucocorticoid therapy (≥20mg prednisone or equivalent for ≥3 months) for bullous pemphigoid. How frequently do you obtain DEXA scan prior to or soon after initiating his course of glucocorticoids?	23.53% Never/almost never 9.80% Once in a while 23.53% Sometimes 25.49% Often 17.65% Always or almost always
You are caring for a an elderly, post-menopausal woman with a T-score of -2.7 on DEXA for whom you prescribe long term, moderate-high dose glucocorticoid therapy (≥20mg prednisone or equivalent for ≥3 months) for bullous pemphigoid. How frequently would you recommend a bisphosphonate for osteoporosis prophylaxis for this patient?	9.80% Never/almost never 5.88% Once in a while 13.73% Sometimes 21.57% Often 49.02% Always or almost always
You are caring for a 65 year-old male with a prior vertebral compression fracture and a 10-year probability of a hip fracture of 3.5% for whom you prescribe long-term, moderate-high dose glucocorticoid therapy (≥20mg prednisone or equivalent for ≥3 months) for bullous pemphigoid. How frequently would you recommend a bisphosphonate for osteoporosis prophylaxis for this patient?	11.76% Never/almost never 5.88% Once in a while 7.84% Sometimes 25.49% Often 49.02% Always or almost always
You determine that a DEXA scan is necessary to determine your patient's baseline bone health prior to initiating glucocorticoids. Who do you typically elect to order and interpret DEXA scans for your patients?	15.69% Myself, the dermatologist 11.76% Sometimes myself, sometimes another provider 58..82% Primary care provider 13.73% Endocrinologist

You determine that an antiresorptive agent such as a bisphosphonate is necessary for your patient. Who do you typically elect to prescribe and manage this medication for your patients?	13.73% Myself, the dermatologist 15.69% Sometimes myself, sometimes another provider 60.78% Primary care provider 9.80% Endocrinologist
How frequently have you prescribed ≥20mg/day prednisone (or equivalent) to any patient for a duration of ≥2 months in the past year?	37.25% Never 54.90% <5 times 3.92% 5-10 times 1.96% 11-20 times 1.96% >20 times
How frequently have you prescribed >7.5mg/day prednisone (or equivalent) to a postmenopausal woman for ≥3 months in the past year?	54.90% Never 37.25% <5 times 7.84% 5-10 times 0% 11-20 times 0% >20 times
How frequently have you prescribed >7.5mg/day prednisone (or equivalent) to a man ≥50 years old for 3 months or more in the past year?	Never <5 times 5-10 times 11-20 times >20 times
Consider a 75 year-old Caucasian man with no history of previous fracture, weight 70 kg (154 lbs), and height 182 cm (6 ft). He smokes a pack of cigarettes a day, drinks 4 alcoholic beverages per day, and has a T score -1.1 on DEXA scan of femoral neck. He is on chronic prednisone at a dose of 5mg a day for chronic obstructive pulmonary disease. He presents to you with bullous pemphigoid, and you want to prescribe a course of oral glucocorticoids.	3.92% Low, no prophylaxis indicated 25.49% Moderate-high, consider prophylaxis 70.59% High, prophylaxis indicated
Consider a 55 year old Caucasian woman with a history of rheumatoid arthritis, weight 70 kg (154 lbs), and height 160 cm (5 ft 3 in). She is postmenopausal. She is not currently taking any glucocorticoids. She does not smoke or drink alcohol. She presents to you with pemphigus vulgaris, and you want to prescribe a course of oral glucocorticoids. What do you estimate is this patient's approximate baseline 10-year risk of major osteoporotic fracture (ie fracture at the spine, forearm, hip or shoulder)?	19.61% Low, no prophylaxis indicated 66.67% Moderate-high, consider prophylaxis 13.73% High, prophylaxis indicated
Consider an 82 year old Caucasian woman with rheumatoid arthritis, history of previous vertebral fracture, weight 50 kg (115 lbs), and height 160 cm (5 ft 3 in). Her bone mineral density (BMD) T-score at the femoral neck as assessed by DEXA is -1.9. She drinks 36oz of beer per day to help her sleep. She presents to you with bullous pemphigoid, and you want to prescribe a course of oral glucocorticoids.	0% Low, no prophylaxis indicated 5.88% Moderate-high, consider prophylaxis 94.12% High, prophylaxis indicated
Consider a 65 year-old Caucasian woman with no history of previous fracture, weight 70 kg (154 lbs), and height 160 cm (5 ft 3 in). She does not smoke or drink alcohol, and has no history of chronic medical illnesses or family history of osteoporosis. She presents to you with bullous pemphigoid, and you want to prescribe a course of oral glucocorticoids.	17.65% Low, no prophylaxis indicated 70.59% Moderate-high, consider prophylaxis 11.76% High, prophylaxis indicated

You are caring for an elderly, post-menopausal woman with a history of prior hip fracture for whom you prescribe long term, moderate-high dose glucocorticoid therapy (≥20mg prednisone or equivalent for ≥3 months) for bullous pemphigoid. What type of osteoporosis prophylaxis is appropriate for this patient? (select all that apply)	0% None 78.43% Vitamin D and calcium (any dose) 80.39% Bisphosphonate (alendronate, risedronate, or other) 3.92% Teriparatide 1.96% Other
Approximately what interval do you obtain follow-up bone mineral density (BMD) measurements on patients who are on long-term glucocorticoid treatment (>6 mo)?	11.76% Every 6 months or less 41.18% Annually 17.65% Every 1-2 years 5.88% More than 2 years 23.53% Never