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Use of topical calcipotriol for identification of patients with psoriasis in administrative healthcare data—a validation study

Dear editor,

Calcipotriol has been used to treat psoriasis for more than three decades.[1,2] Previous interview data of 44 Danish dermatologists and 93 general practitioners have indicated that calcipotriol (alone or combined with topical corticosteroids [TCS]) was the most commonly used treatment for newly diagnosed psoriasis patients (48–54%) and that this was used in 71% of patients receiving continuing topical treatment.[3] In settings where complete data from general practitioners and private practice dermatologists are lacking, calcipotriol is frequently used as a proxy for identification of patients with psoriasis.[3–7] We validated the accuracy of identifying psoriasis through filled prescriptions for calcipotriol using administrative healthcare data. The Danish Skin Cohort provided data for this study.[8] Briefly, randomly selected adults (≥18 years) from the Danish general population were included, and these were linked on individual level with administrative prescription data.[9,10] These individuals were classified into 'no psoriasis' if they had never had psoriasis (physician diagnosed or self-reported), 'any psoriasis' (either physician diagnosed or self-reported), 'any physician diagnosed psoriasis' or 'dermatologist diagnosed psoriasis', respectively.

We calculated the sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio (LR+) and negative likelihood ratio (LR−), respectively, for use of one or more filled prescriptions of calcipotriol (Anatomical Therapeutic Chemical codes D05AX02 or D05AX52) to identify patients with psoriasis.

Table 1 Validity of using topical calcipotriol to identify people with psoriasis

	Topical calcipotriol			
	≥1 prescription	≥2 prescriptions	≥3 prescriptions	≥4 prescriptions
Any psoriasis				
Sensitivity	27.6% (22.4–33.3%)	18.2% (13.8–23.3%)	16.0% (11.9–20.9%)	13.8% (10.0–18.5%)
Specificitiy	99.2% (98.8–99.5%)	99.7% (99.4–99.8%)	99.8% (99.6–99.9%)	99.9% (99.7–100.0%)
PPV	74.5% (64.9–82.6%)	83.3% (71.5–91.7%)	89.8% (77.8–96.6%)	92.7% (80.1–98.5%)
NPV	94.1% (93.2–94.8%)	93.4% (92.5–94.2%)	93.2% (92.3–94.0%)	93.0% (92.1–93.9%)
LR+	33.7 (22.0–51.8)	57.7 (29.6–112.5)	101.6 (40.6–254.0)	146.2 (45.4–470.5)
LR−	0.7 (0.7–0.8)	0.8 (0.8–0.9)	0.8 (0.8–0.9)	0.9 (0.8–0.9)
Physician diagnosed				
Sensitivity	33.5% (27.3–40.1%)	22.2% (16.9%-28.2%)	19.5% (14.5–25.3%)	16.7% (12.1–22.3%)
Specificitiy	99.2% (98.8–99.5%)	99.7% (99.4–99.8%)	99.8% (99.6–99.9%)	99.9% (99.7–100.0%)
PPV	74.0% (64.3–82.3%)	83.1% (71.0–91.6%)	89.6% (77.3–96.5%)	92.5% (79.6–98.4%)
NPV	95.5% (94.8–96.2%)	94.8% (94.0–95.6%)	94.7% (93.9–95.4%)	94.5% (93.7–95.3%)
LR+	40.9 (26.71–62.56)	70.4 (36.1–137.0)	123.5 (49.4–308.7)	177.1 (55.1–569.9)
LR−	0.7 (0.61–0.74)	0.8 (0.7–0.8)	0.8 (0.8–0.9)	0.8 (0.8–0.9)
Dermatologist diagnosed				
Sensitivity	43.0% (35.0–51.3%)	30.5% (23.2–38.5%)	27.2% (20.2–35.0%)	23.2% (16.7–30.7%)
Specificitiy	99.2% (98.8–99.5%)	99.7% (99.4–99.8%)	99.8% (99.6–99.9%)	99.9% (99.7–100.0%)
PPV	71.4% (61.0–80.4%)	82.1% (69.6–91.1%)	89.1% (76.4–96.4%)	92.1% (78.6–98.3%)
NPV	97.3% (96.7–97.9%)	96.8% (96.1–97.4%)	96.6% (96.0–97.2%)	96.5% (95.8–97.1%)
LR+	52.6 (34.4–80.3)	96.7 (49.8–187.8)	172.4 (69.1–429.9)	245.2 (76.3–788.3)
LR−	0.6 (0.5–0.7)	0.7 (0.6–0.8)	0.7 (0.7–0.8)	0.8 (0.7–0.8)

LR−, negative likelihood ratio; LR+, positive likelihood ratio; NPV, negative predictive value; PPV, positive predictive value.

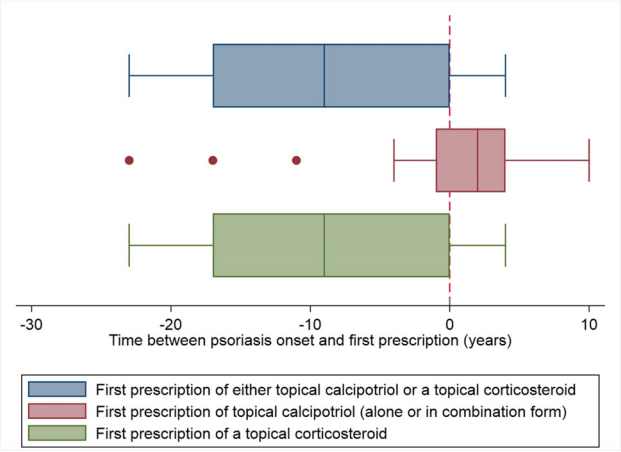

Figure 1 Time between psoriasis onset (patient-reported) and when the first-ever prescription of topical calcipotriol or topical corticosteroid was filled. Data are presented as horizontal box plots where the box comprises the 25th and 75th percentile. The vertical line inside the box is the median.

We estimated the time between patient-reported year of psoriasis onset and first-ever filled prescription for calcipotriol, a TCS or either of the two, respectively. Analyses of time from disease onset were limited to patients with a current disease duration of ≤15 years, to ensure sufficient prescription data prior to disease onset. Analyses were performed using SAS v9.4 (SAS Institute Inc., Cary, NC, USA) and Stata v15.0 (StataCorp, College Station, TX, USA).

Among the total study population (n = 3449), there were 275 people with psoriasis, of whom 221 (80.4%) had been diagnosed by a physician (54.9% by a dermatologist). There was a female predominance (non-psoriasis = 55.3% and psoriasis = 57.5%), and the mean age for psoriasis patients was 56 years.

Use of at least one prescription of topical calcipotriol had a low sensitivity (27.6%; 95% CI: 22.4–33.3%), but a high specificity (99.2%; 95% CI: 98.8–99.5%). Restricting analyses to physician diagnosed and dermatologist diagnosed psoriasis, respectively, increased the sensitivity (33.5% and 43.0%, respectively) but not specificity (Table 1). Using two, three or four filled prescriptions for topical calcipotriol to define psoriasis decreased sensitivity, but increased PPV and LR+, whereas the other estimates remained largely unchanged (Table 1). Median time from patient-reported psoriasis onset until they had filled their first prescription of topical calcipotriol was 2 years (IQR -1–4 years), as shown in Fig. 1. Patients generally had filled prescriptions for TCS several years before first reported onset of psoriasis (median -9 years and IQR -17–0 years).

We found that topical calcipotriol has a high specificity and PPV, but a very low sensitivity when used to identify adults with psoriasis. First filled prescription of topical calcipotriol (but not TCS) may be used to estimate disease onset with reasonable accuracy. TCS are commonly prescribed drugs used for a wide range of unspecific symptoms (e.g, pruritus), and may therefore represent presence of other skin diseases occurring prior to psoriasis onset. Restricting analyses to individuals that have filled more than one calcipotriol prescription may further increase diagnostic accuracy and is therefore preferable, but even one prescription may be sufficient in some cases. However, due to the low sensitivity, calcipotriol is an insufficient proxy in studies where psoriasis is the outcome (e.g, prevalence studies), since many patients will not be accurately captured solely by filled prescriptions of calcipotriol.

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A. Egeberg,* Y.M.F. Andersen
Department of Dermatology and Allergy, Herlev and Gentofte Hospital, University of Copenhagen, Hellerup, Denmark
*Correspondence: A. Egeberg. E-mail: alexander.egeberg@gmail.com

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