Appendix S1

SUPPLEMENTARY METHODS

Study design and participants

A multicentre retrospective cohort study was performed to assess disease and treatment patterns in older adults (≥65 years) with psoriasis (Geriatric Psoriasis Patterns (GEPPA) study). Relevant parameters for this study were gathered from a literature review, a previous survey, and multidisciplinary brainstorm sessions (15). All patients were diagnosed with psoriasis by a dermatologist and treated in one of the six participating centres in the Netherlands: one academic medical centre (Radboud university medical centre, Nijmegen), four general hospitals (Gelderse Vallei Hospital, Ede; Canisius-Wilhelmina Hospital, Nijmegen; Bernhoven Hospital, Uden; Rijnstate Hospital, Arnhem) and one private practice (Padberg Clinic, Ede). In the current study only treatment episodes (TEs) of patients using systemic therapy for psoriasis were included (conventional systemic and biological/apremilast therapies). One TE accounted for one continuous episode of a specific systemic antipsoriatic therapy. Approval from the Medical Ethical Committee Arnhem-Nijmegen (reference number: 2019-5904) and written informed consent from each patient were obtained.

Outcome measures

Various patient and treatment characteristics were collected, including comorbid disease status, comedication use, and presence of polypharmacy. To measure comorbid disease status the ICD-10 version of the Charlson Comorbidity Index (CCI) was used (20). In addition to the CCI categorisation, the following comorbidities of special interest were also separately classified, because of their (potential) relatedness to psoriasis (treatment): skin cancer, depression, hypertension, hyperlipidaemia, overweight, obesity and cardiovascular disease. Polypharmacy was defined as the simultaneous use of ≥5 medications (21). To assess treatment patterns, the current use of systemic therapy and TEs regarding systemic antipsoriatic therapy were collected from patients charts from the age of 65, including: treatment duration, AE-occurrence and reasons for treatment discontinuation. If patients were using >1 systemic antipsoriatic treatment simultaneously or a combination of UV-therapy and systemic antipsoriatic treatment these TEs were excluded from analyses on AEs and treatment discontinuation, as it was not possible to further distinguish these outcomes in relation to the individual treatments. Furthermore, systemic treatments with <10 accounted TEs were excluded from further analysis, to avoid having multiple small treatment groups with low statistical power to draw conclusions from.

Adverse events and causality assessment

An AE was defined as any undesirable medical event of significant nature during antipsoriatic treatment (e.g. requiring a doctor's visit, dose alterations, or other medical interventions). An AE was classified as serious AE (SAE) when a patient needed hospitalisation, had persistent or significant disability/incapacity, and occurrence

of life-threatening conditions or death (22). AEs were independently assessed on causality by three physician-researchers (SL, EtH, LvS) using the WHO-UMC causality assessment system and clinical experience (23), followed by a consensus meeting. The WHO-UMC causality system consists of the following categories: certain (5), probable (4), possible (3), unlikely (2), unassessable (1) and conditional (0). AEs scored <3 were excluded. AEs scored as ≥3 remained included, further mentioned as causality assessed AEs (caAEs). From the available TEs, incidence rate ratios (IRR) of AEs per year for the selected systemic therapy were computed.

Data collection and processing

Patients were chronologically included based on their last visit, starting from January 1, 2019. To provide an overview of the whole population of older adults with psoriasis using systemic therapy, no selection on disease severity was made. Data were obtained from the medical charts and processed anonymously using Castor Electronic Data Capture, a web-based data management system (Castor Research Inc., Hoboken, NJ, USA) (EtH, EtB). To confirm accurate data entry, 10% of the data were manually checked for discrepancies by a second researcher (EtH, SL).

Statistical analyses

Due to the explorative nature of this study, a formal power calculation was not possible. Descriptive analyses were performed to summarize data. Categorical data were presented as frequency/percentages. Continuous variables were presented as mean/standard deviation (SD) or median/range, when applicable. To indicate representativeness of our study population, a comparison with other psoriasis cohorts including older adults was performed on age and sex distribution using a chi-square test and an independent T-test (10, 15, 24).

To analyse the IRRs of AEs per year, negative binomial models were used. The number of caAEs in an episode was the dependent variable, and the specific systemic treatment of that episode the independent variable. The length of the episode was used as offset for the model. As episodes were clustered within patients, a multilevel model was applied with a random intercept for each patient. Additionally, a similar analysis was performed including all AEs without selecting for caAEs only. A model for SAEs regardless of causality assessment was not possible due to the low numbers.

To explore the potential relationship between age, comorbidity and AE-occurrence on current specific systemic treatments, and to correct for confounding variables, multivariable logistic regression analysis was performed with the caAEs only. In addition, a sensitivity analysis including all reported AEs was performed. After a consensus meeting and taking data availability into account other variables of potential influence included were: age at psoriasis onset, presence of psoriatic arthritis, polypharmacy, history of cancer, liver disease, kidney disease, cardiovascular disease, overweight, and sex. First, age and the CCI were assessed in the model. Then, all other variables were added to the model one by one and excluded if $p>0.2$. Subsequently, the combination of all the relevant identified variables were used in multivariable logistic regression analysis.

Missing values were not included in the analyses. Statistical analyses were performed using Statistical Package for Social Sciences (SPPS) version 25.0 (IBM, Armonk, NY, USA) and for the negative binomial analysis R (version 3.6.3) and the lme4 library (version 1.1–21) were used (25).