ORIGINAL RESEARCH

Cutaneous adverse events and quality of life in outpatients receiving anticancer agents: results from an observational, cross-sectional study

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Abstract

Background: Despite growing interest in cutaneous adverse events (CAEs) and their management in patients with cancer, they are often underreported and there are no extensive data on their impact on quality of life (QoL). Healthcare professionals should consider this issue in order to minimize its negative impact on QoL and improve patient outcomes. This study evaluates the impact of CAEs on QoL in outpatients receiving anticancer drugs and aims to determine the differences in QoL between conventional chemotherapy *versus* targeted therapies.

Methods: A total of 114 cancer patients with CAEs were included in this observational, cross-sectional study. Patient-reported outcomes instruments (Functional Assessment of Cancer Therapy – General, Dermatology Life Quality Index, and Skindex-16) were used.

Results: Mean scores in QoL indices were 65.3±13.4, 8.4±5, and 30.8±16.9 in Functional Assessment of Cancer Therapy – General, Dermatology Life Quality Index, and Skindex-16, respectively. The CAEs that had the greatest impact on dermatologic-related QoL were hand–foot skin reaction, rash, palmo-plantar erythrodysesthesia, and papulopustular eruption. No significant differences in QoL indices according to the type of treatment (conventional chemotherapy *versus* targeted therapy) were observed.

Conclusions: CAEs, and particularly hand–foot toxicities, rashes, and papulopustular eruptions, can have an impact on QoL in outpatients receiving anticancer drugs as evaluated with three different patient-reported outcomes instruments. No differences in QoL related to CAEs were observed between conventional chemotherapy and targeted therapy.

Keywords: cutaneous adverse events, patient-reported outcomes, quality of life, targeted therapies.

Introduction

In recent years, significant progress has been made in the development of more effective anticancer agents. Many studies have demonstrated that new agents, including targeted therapies, offer better disease control and survival rates compared to classical cytotoxic chemotherapies.[1–6] However, new drugs usually mean new adverse event profiles, including cutaneous adverse events (CAEs). Specifically, molecularly targeted drugs are frequently associated with skin toxicities, such as papulopustular eruptions, xerosis and pruritus, palmo-plantar erythrodysesthesia, and hair and nail changes.[7–13]

Multiple systems have been developed for the rating of the adverse effects of cancer treatment. The National Cancer Institute Common Terminology Criteria for Adverse Events (CTCAE) is a standardized tool commonly used in both research and clinical settings to recognize and grade the side effects of therapies.[14] However, it is not uncommon to find discrepancies in severity grading between patients and clinicians. Thus, the use of patient self-reporting of symptoms can improve the recognition and timely management of the adverse effects of anticancer therapies.[7–10,15] Patient-reported outcomes (PRO) instruments are increasingly used in cancer patients to evaluate the impact of dermatologic adverse events on quality of life (QoL), and they can be helpful as a

supplement to CTCAE in the assessment of the overall effect of CAEs on physical, emotional, and psychosocial wellbeing. In general, patients with cancer are inclined to accept repeated PRO evaluations, making its implementation feasible. In addition, the use of these instruments encourage patients to talk with their doctors about the impact of CAEs on their overall wellbeing.[16–25]

To our knowledge, the impact of CAEs on the QoL of patients receiving anticancer agents has not been extensively studied. The main objective of our study was to evaluate the impact of CAEs on the QoL of patients receiving anticancer drugs in daily clinical practice. The secondary objective was to evaluate differences in the overall QoL and dermatologic-related QoL according to anticancer treatment (chemotherapy *versus* targeted therapies). We aimed to assess this impact through three different PRO questionnaires, an approach that, to our knowledge, is original.

Methods

Study design

This was an observational, cross-sectional, single-center study with a duration of 9 months, performed between April 2018 and December 2018, involving the collection of clinical data and subjective patient data in relation to their QoL.

Study population and recruitment

Consecutive sampling of patients meeting eligibility criteria (age ≥18 years, active antineoplastic treatment administered in the outpatient setting, and presence of a CAE) was performed at the Medical Oncology Service of the University Hospital Center of Pontevedra, Spain. Patients receiving radiotherapy at the time of initial evaluation and those not able to answer PRO questionnaires were excluded. Physicians and nursing staff at the Day Hospital of the Medical Oncology Service and at the hospital dispensing office of cancer drugs carried out recruitment.

Study procedures and variables

Informed consent was obtained from study participants prior to any study procedure. Patients that met the eligibility criteria were evaluated by a medical oncologist and a dermatologist. Detailed history and examination were performed to confirm the CAE and classify it according to usual clinical practice.

The main study variable was the impact of CAEs of anticancer drugs on QoL. The following validated QoL questionnaires were selected according to previous clinical experience:[17–25] the Functional Assessment of Cancer Therapy – General (FACT-G), a widely used PRO instrument used to assess the impact of cancer therapy in four different domains (physical,

social/family, emotional, and functional) over the last 7 days through a 27-item scale;[17–19] the Dermatology Life Quality Index (DLQI), a 10-item questionnaire used to assess the impact of CAEs on patients' QoL over the previous week, covering aspects such as symptoms, daily activities (work/study, home care, social, sport), personal relationships, embarrassment, or treatment-related issues;[20,21] Skindex-16, a 16-item questionnaire developed to measure the effect of skin diseases on patients' QoL within the previous week and with three subscales (symptom, emotional, and functional);[22,23] and FACT-EGFRI-18 (Functional Assessment of Cancer Therapy – Epidermal Growth Factor Receptor Inhibitor-18), a specific 18-item questionnaire that measures the effect of EGFRIs on QoL, also with different domains (physical, social/emotional, and functional).[24,25]

The overall QoL of patients was evaluated through FACT-G (scale range 0–108, higher score reflects better QoL). QoL related to CAEs was assessed using PRO measures such as DLQI (scale range 0–30, higher score reflects worse QoL), Skindex-16 (scale range 0–96, higher score reflects worse QoL), and FACT-EGFRI-18 (scale range 0–72, higher score reflects better QoL) questionnaires.

FACT-G, DLQI, and Skindex-16 were delivered to all patients. In addition, FACT-EGFRI-18 was administered to patients who had CAEs related to EGFRI administration. The necessary licenses for the use of the different QoL questionnaires were obtained. Furthermore, data on demographic and clinical characteristics were collected through participant interview as well as by review of their medical history using IANUS, an informatic program designed by the Department of Health of Galicia, Spain to digitize clinical files.[26] CTCAE (version 4.03) was used to determine the severity of CAEs.[14]

Targeted therapies were considered as all those that act against specific molecular targets (e.g., EGFR, HER-2, RAS, BRAF, MEK, KIT, RET, mTOR, VEGFR). Tyrosine kinase inhibitors, monoclonal antibodies, and immunotherapies, such as anti-CTLA-4 or anti-PD-1/PD-L1 antibodies, were also included in the group of targeted therapies. All classic antineoplastic drugs (e.g. alkylating agents, antimetabolites, vinca alkaloids, antimicrotubule agents, and others) were considered conventional chemotherapy.

Sample size and statistical analysis

Sample size
To assess differences in impact on QoL between conventional chemotherapy and targeted therapy, a sample size of 84 people was determined with a 95% confidence level. Considering a possible non-response rate of 15%, a sample size of 98 people was calculated.

Statistical analysis
Stata V12.0 statistical software (Stata Corporation, College Station, TX, USA) was used for statistical analysis.

Descriptive analysis

The clinical and sociodemographic characteristics of the sample were described using measures of central tendency (mean or median) and dispersion (standard deviation or interquartile range), in the case of quantitative variables, as well as frequency tables and distribution of percentages in the case of qualitative variables.

Quality of life

Patients with different levels of QoL were compared using statistical hypothesis testing (Student t-test, Mann–Whitney U test, χ^2 test). The existence of differences in the cutaneous QoL (Skindex-16 and DLQI) by type of antineoplastic treatment received (targeted *versus* non-targeted therapies) was also evaluated. The significance level of all statistical test results was evaluated with a two-sided alpha level of 0.05.

The global QoL (FACT-G) and its association with the severity and number of CAEs, performance status, type of tumor, tumor stage, type of treatment, and number of cycles received was studied with a contrast test of mean differences for continuous variables with normal distribution (ANOVA) or non-normal distribution (Kruskal–Wallis). Possible QoL predictors were studied using a multivariate linear regression model. The effects of possible confounding factors (type of tumor, type of antineoplastic treatment, stage and performance status, previous medical conditions, age, and sex) were controlled.

Results

Characteristics of the study population

A total of 131 patients were eligible for the study and 17 declined to participate. Thus, 114 patients were included in the study. The demographic and clinical characteristics of the study population are summarized in Table 1.

Type of treatment

Regarding classic chemotherapy medicines, the most frequently administered drugs were part of schemes that included 5-FU or derivatives in combination with oxaliplatin or irinotecan (41.9%), followed by taxanes in monotherapy (20.9%), regimens with anthracyclines and alkylating agents (14.8%), schemes with platinum salts and taxanes, vinca alkaloids or others (12.3%), and others (9.8%).

Regarding targeted therapies, immunotherapy (27%) was the most frequently used, followed by EGFRIs (21%), VEGF inhibitors (17%), multikinase inhibitors (14%), HER2 inhibitors (13%), and others (8%).

Identified CAEs

Among the 114 patients included, the total number of CAEs was 177. The most frequent CAEs were pruritus, xerosis, palmo-

Table 1. Demographic and clinical characteristics.

Variable	Total (*n*=114)
Gender, *n* (%)	
- Male	49 (43.0)
- Female	65 (57.0)
Age at diagnosis, years	
- Mean (SD)	59.9 (11.7)
- Median (IQR)	62.5 (50.3–68.5)
Tumor type, *n* (%)	
- Gastrointestinal	42 (36.8)
- Breast	33 (28.9)
- Lung	19 (16.7)
- Urological/renal	11 (9.6)
- Gynecologic	4 (3.5)
- Other	5 (4.4)
Tumor stage, *n* (%)	
- Stage 2	11 (9.6)
- Stage 3	16 (14.0)
- Stage 4	87 (76.3)
Type of treatment, *n* (%)	
- Conventional chemotherapy	46 (40.3)
- Targeted therapy	68 (59.6)
Previous lines of treatment, *n*	
- Mean (SD)	1.46 (0.96)
- Median (IQR)	1 (1–2)
Treatment duration, months	
- Mean (SD)	6.7 (6.5)
- Median (IQR)	4 (2–9)
Previous medical conditions	
- Yes	76 (66.6)
- No	38 (33.4)
ECOG performance status	
- 0 (Asymptomatic)	2 (1.7)
- 1 (Symptomatic, but completely ambulatory)	89 (78.1)
- 2 (Symptomatic, <50% of time in bed)	21 (18.4)
- 3 (Symptomatic, >50% of time in bed)	2 (1.7)

plantar erythrodysesthesia, alopecia, and papulopustular eruption (Table 2). Regarding the number of CAEs, the majority of patients reported one CAE (56.1%), while 37 (32.5%) and 13 (11.4%) reported two and three CAEs, respectively.

According to severity of CAEs, most patients experienced grade 1 CAEs (54.3%), while 35.1 and 10.5% experienced grades 2 and 3 CAEs, respectively; no grade 4 CAEs were observed.

CAE management was provided to 90.3% of the cases with topical treatment (topical corticosteroids, topical antibiotics,

Table 2. Cutaneous adverse events (CAEs).

Variable	Total (177 CAEs)
Type of CAE, *n* (%)	
- Pruritus	29 (16.3)
- Xerosis	24 (13.5)
- Palmo-plantar erythrodysesthesia	24 (13.5)
- Alopecia	21 (11.8)
- Papulopustular eruption	17 (9.6)
- Ungual apparatus lesions	13 (7.3)
- Pigmentary changes	13 (7.3)
- Rash	9 (5.0)
- Hand–foot skin reaction	6 (3.3)
- Photosensitivity	6 (3.3)
- Other*	15 (8.4)
Number of CAE, *n* (%)	
- Patients with only one CAE	64 (56.1)
- Patients with two CAEs	37 (32.5)
- Patients with three CAEs	13 (11.4)
Severity of CAE, *n* (%)	
- Grade 1	112 (63.2)
- Grade 2	53 (29.9)
- Grade 3	12 (6.7)
- Grade 4	0

*Other: bullous pemphigoid, eyelid edema, telangiectasis, purpura, hypertrichosis, trichomegaly, folliculitis, balanitis

Table 3. Quality of life indices.

Indices	Total (114)
FACT-G (total score 0–108)	
- Mean (SD)	65.3 (13.4)
- Median (IQR)	66 (57–74)
Physical well-being (score 0–28)	
- Mean (SD)	17.2 (5.0)
- Median (IQR)	17 (14–21)
Social/family well-being (score 0–28)	
- Mean (SD)	19.3 (4.3)
- Median (IQR)	20 (17–21)
Emotional well-being (score 0–24)	
- Mean (SD)	14.3 (4.0)
- Median (IQR)	14 (11–18)
Functional well-being (score 0–28)	
- Mean (SD)	14.5 (4.8)
- Median (IQR)	14.5 (11–18)
DLQI (total score 0–30)	
- Mean (SD)	8.4 (5)
- Median (IQR)	8 (5–12)
Skindex-16 (total score 0–96)	
- Mean (SD)	30.8 (16.9)
- Median (IQR)	29 (19–44)
Symptoms domain (0–24)	
- Mean (SD)	10.6 (6.1)
- Median (IQR)	11 (6–15)
Emotions domain (0–42)	
- Mean (SD)	15.0 (8.8)
- Median (IQR)	13 (9–21)
Functioning domain (0–30)	
- Mean (SD)	5.2 (5.7)
- Median (IQR)	3 (0–8)

moisturizing creams, topical keratolytic agents); only 9.6% of cases required systemic treatment (systemic corticosteroid therapy, systemic antibiotic with anti-inflammatory action, doxycycline, antihistamines). Papulopustular eruption was the CAE that most frequently required systemic treatment.

QoL indices

The mean (SD) scores of the total study population were 65.3±13.4 in FACT-G, 8.4±5 in DLQI, and 30.8±16.9 in Skindex-16. Additional sub-analysis according to the specific domains of FACT-G (physical wellbeing, social/family wellbeing, emotional wellbeing, functional wellbeing) and Skindex-16 (symptoms, emotions, functioning) are provided in Table 3.

A total of 17 patients with anti-EGFR toxicities completed the FACT-EGFRI-18 questionnaire. The mean score of this subgroup was 47.2±13.2. In this group, mean values of FACT-G, DLQI, and Skindex-16 were 64.1±18.7, 8.4±4.5, and 33.5±19.7, respectively.

Specific cutaneous toxicities and QoL indices (FACT-G, DLQI, and Skindex-16) are presented in Table 4. The CAEs that had the greatest impact on dermatologic-related QoL were hand–foot skin reaction, rash, palmo-plantar erythrodysesthesia, and papulopustular eruption. CAEs that had the least impact were pigmentary changes, alopecia, and xerosis.

QoL indices and differences between conventional chemotherapy *versus* targeted therapy

Herein, no significant differences in QoL indices (FACT-G, DLQI, Skindex-16) were observed according to the type of treatment (conventional chemotherapy *versus* targeted therapy plus combined therapy). The mean (SD) and median (IQR) scores for the Skindex-16 symptoms, emotions, and functioning domains are presented in Table 5, whereas figure 1 shows the differences

Table 4. Cutaneous adverse events (CAEs) and quality of life indices.

CAE	FACT-G Mean (SD)	DLQI Mean (SD)	Skindex-16 Mean (SD)
- Palmo-plantar erythrodysesthesia	61.0 (12.6)	8.9 (3.6)	31.1 (13.9)
- Pruritus	61.4 (14.1)	7.5 (3.9)	23.9 (14.8)
- Papulopustular eruption	64.1 (18.7)	8.4 (4.5)	33.5 (19.7)
- Alopecia	62.6 (10.4)	5.8 (4.4)	24.6 (13.9)
- Xerosis	68.0 (7.9)	5.3 (3.6)	24.3 (23.7)
- Ungual apparatus	62.2 (14.9)	6.2 (5.5)	23.4 (15.1)
- Rash	63.1 (15.4)	10.1 (7.4)	40.3 (16.4)
- Hand–foot skin reaction	60.7 (3.4)	14.5 (4.4)	45.6 (7.3)
- Pigmentary changes	73.1 (18.8)	3.1 (6.0)	10.0 (18.1)

Table 5. Quality of life (QoL) indices and differences between conventional chemotherapy *versus* targeted therapy.

	Total (*n*=114)	Conventional chemotherapy (*n*=46)	Targeted therapy (*n*=68)	*p*
FACT-G (total score 0–108)				
- Mean (95% CI)	65.3 (62.8–67.8)	66.5 (62.7–70.3)	64.1 (60.9–67.3)	0.573
DLQI (total score 0–30)				
- Mean (95% CI)	8.4 (7.5–9.3)	7.7 (6.2–9.2)	8.9 (7.8–10.0)	0.160
Skindex-16 (total score 0–96)				
- Mean (95% CI)	30.8 (27.7–33.9)	29.2 (24.3–34.1)	31.9 (27.9–35.9)	0.477
Skindex symptoms				
- Mean (95% CI)	10.6 (9.5–11.7)	10.6 (8.6–12.6)	10.5 (9.2–11.8)	0.864
Skindex emotions				
- Mean (95% CI)	15.0 (13.4–16.6)	13.7 (11.2–16.2)	15.9 (13.8–17.9)	0.148
Skindex functioning				
- Mean (95% CI)	5.2 (4.2–6.3)	4.9 (3.3–6.5)	5.5 (4.1–6.9)	0.799

DLQI, Dermatology Life Quality Index; FACT-G, Functional Assessment of Cancer Therapy – General.

between conventional chemotherapy and targeted therapy in FACT-G, DLQI, and Skindex-16.

Other results

An association was found between general QoL, measured by FACT-G, and tumor stage (p=0.02), ECOG performance status (p<0.001), and the number and severity of CAEs (p=0.032 and p=0.01, respectively). On the contrary, general QoL was not associated to the type of tumor, type and duration of treatment, or the number of previous treatment lines received. Multivariate analysis showed that the variables associated with worse QoL were advanced tumor stage (p<0.01), poor ECOG performance status (p<0.0001), and female sex (p=0.02).

Figure 1.   Quality of life (QoL) indices and differences between conventional chemotherapy versus targeted therapy. Mean QoL indices scores of conventional chemotherapy and targeted therapy in (A) FACT-G, (B) DLQI, and (C) Skindex-16.
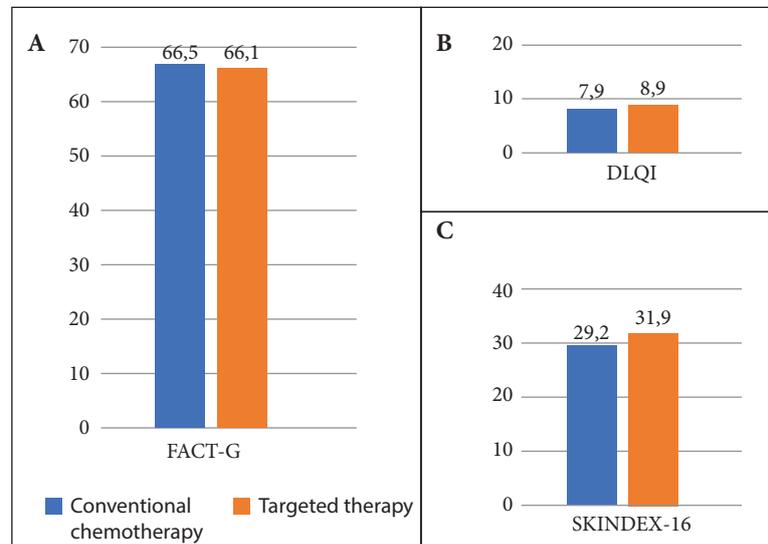
DLQI, Dermatology Life Quality Index; FACT-G, Functional Assessment of Cancer Therapy – General.

Discussion

The objective of our study was to evaluate the impact of CAEs on QoL in outpatients receiving anticancer drugs. Herein, using multiple QoL indices, we observed that CAEs can have an impact on general and dermatological QoL, in particular those affecting hands and feet, rash, and papulopustular eruption.

Despite the growing interest and attention on skin toxicities induced during cancer treatment, their impact on QoL is rarely considered. The underrated impact of skin toxicities may stem from their secondary nature in relation to the underlying problem (a potentially fatal disease) or to the popularly known side effects of anticancer therapies such as hair loss and mucosal, gastrointestinal, or hematological toxicities.[1–8,10–17,27–29]

The visible degree of the disease often does not correlate with patient distress and impact on QoL. Therefore, the severity of CAEs must be related both to its type and clinical extent as well as to its effects on a patient's QoL. In our study, we assessed the overall QoL of patients using the FACT-G questionnaire as it is an effective scale that has been validated for use with cancer patients and is one of the most widely used measures of cancer-specific health-related QoL. Dermatological-related QoL was assessed using other validated PRO instruments (DLQI, Skindex-16, and FACT-EGFRI-18).[11,16–26,30,31]

In the past, alopecia and mucositis were the most common CAEs associated with conventional chemotherapy. With the development of target-specific therapies, other CAEs have become more common, including palmo-plantar erythrodysesthesia, papulopustular eruption, hand–foot skin reaction, xerosis, fissures, pruritus, and pigmentary or ungual apparatus changes (paronychia, onycholysis).[1–6,14,32] According to Lacouture et al.,[28] cutaneous toxicities are very common and varied in patients treated with targeted therapies. These toxicities diminish the QoL of patients, which impacts their adherence to treatment, jeopardizing its success and patient survival.

In our study, the CAEs that had the highest impact on dermatological-related QoL were hand–foot skin reaction, rash, palmo-plantar erythrodysesthesia, and papulopustular eruption; those with the lowest impact were pigmentary changes, alopecia, and xerosis. Most of the cases were managed with topical treatment; papulopustular eruption was the CAE that most frequently required systemic treatment. The management of CAEs depends on the specific skin toxicity and its severity. In general, mild cases can be treated with topical treatments, including moisturizing creams, and more severe cases may need systemic treatment, dose adjustments, or treatment interruptions. For example, mild papulopustular eruptions can be treated with topical drugs (erythromycin, clindamycin, metronidazole, corticosteroids) but more severe cases may need systemic treatment (tetracycline, doxycycline, corticosteroids). Toxicities affecting hands and feet can be managed with moisturizers, topical or systemic corticosteroids, keratolytic agents in hyperkeratotic areas (e.g., urea 10%

cream), and topical analgesics (lidocaine 5% ointment).[7] A comprehensive and individualized approach should be performed in order to minimize the negative impact on QoL and improve patient outcomes.

In a clinical trial using EGFRI, Joshi et al.[27] reported that skin toxicities, including rash, xerosis, paronychia, and pruritus, adversely affected QoL, and rash was associated with a greater QoL decrease. Lee et al.[33] also evaluated the impact of skin problems on QoL in patients treated with anticancer agents and reported that palmo-plantar lesions, papulopustular eruption, and periungual inflammation had the highest impact. Similarly, Urakawa et al.[34] found that hand–foot syndrome was a stronger factor in decreasing QoL compared to other skin toxicities of chemotherapy. Conversely, xerosis, pigmentary changes, and paronychia were not statistically associated with QoL.

Although alopecia is a well-known side effect that negatively impacts the QoL of cancer patients, our study suggested that hair loss induced by anticancer therapy did not cause additional distress in dermatological-related QoL. Perhaps the disfiguration itself has little effect on the QoL in patients treated with anticancer therapy as it is not associated with discomfort such as itching or pain. In addition, because hair loss is one of the best-known adverse reactions, patients commonly expect hair loss during anticancer therapy and take it for granted, whereas they do not expect other skin toxicities to be induced by anticancer therapy.[1,2,11–13,27–29] Therefore, patient counseling prior to treatment and preventive interventions are crucial to minimize the negative impact on QoL and improve adherence to treatment.

Our study did not find differences in QoL between classical chemotherapy and molecularly targeted therapy, which is in contrast to previous findings. Rosen et al.[29] addressed this issue, and found that patients on targeted therapies experienced a significantly greater number of CAEs and worse QoL with regards to total Skindex-16 and the emotion subdomain compared with patients on non-targeted therapies. Lee et al.[33] also reported that patients on targeted therapy experienced worse QoL by means of DLQI. However, Unger et al.[35] did not find differences in QoL between targeted therapy alone and combined targeted therapy and chemotherapy. These discrepancies may be due to differences in study designs and PRO instruments used to evaluate QoL, and highlights the interest in addressing this topic.

Self-reporting of symptoms can help to improve CAE reporting and treatment in both research and clinical settings.[1–4,8–10,14] Discordance is commonly observed between objective and subjective measures of CAEs in the management of many types of cancer, indicating that there may be a need to incorporate PRO instruments to regularly assess CAEs from the patient's perspective. According to Chan et al.,[1] close monitoring, early recognition, and early intervention of CAEs may relieve symptoms and reduce their duration, ultimately leading to improvements in the QoL of patients. Therefore, PRO instruments that evaluate the health-related QoL of patients with cancer experiencing CAEs are increasingly relevant in the evaluation of novel therapies.[16–25]

A limitation of our study is that it had an observational design and was limited to patients from one institution. This could have affected the results and may limit its generalizability. Statistical testing for the adequacy of sample size suggested it was large enough for the objectives of the study. Other limitations are related to PRO instruments. DLQI is a validated instrument widely used for assessing QoL in individuals with skin conditions, although it was not created specifically for this purpose. Skindex-16 does not specifically address hair, nails, or mucous membranes, which are additional significant targets for EGFRI-induced toxicity. To offset this limitation, in our study, we additionally used the specific PRO FACT-EGFRI-18. Although some symptoms of skin toxicities, such as pruritus and pain, can be subjectively assessed only by patients, the most commonly used endpoints have traditionally been clinician-reported outcomes. PRO measures provide useful and reliable information, yet only a thorough clinical examination and a personal discussion of skin toxicities allow for an evaluation of its full impact on QoL.[1–3,11,16] In our study, both interventions were performed. Every patient included completed all of the three PRO questionnaires (FACT-G, DLQI, Skindex-16) and was evaluated by an oncologist and a dermatologist to confirm the adverse event and determine its severity. To our knowledge, this is an original approach.

Conclusion

Herein, we observed that CAEs can have an impact on the QoL of outpatients receiving anticancer drugs, as measured with three different PRO instruments (FACT-G, DLQI, and Skindex-16). The CAEs that had the greatest impact on QoL were hand–foot skin reaction, rash, and palmo-plantar erythrodysesthesia and those with the least impact were pigmentary changes, alopecia, and xerosis. No differences were observed in QoL indices between conventional chemotherapy and targeted therapy. Having an advanced tumor stage, poor ECOG performance status, and a greater number and severity of CAEs were associated with worse QoL.

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