DOSIMETRIC FEATURES, SAFETY AND EFFICACY OF ELECTRONIC BRACHYTHERAPY FOR ELDERLY PATIENTS WITH NON-MELANOMA SKIN CANCER: PRELIMINARY RESULTS

Caratteristiche dosimetriche, tollerabilità ed efficacia di un sistema di brachiterapia elettronica per il trattamento delle neoplasie cutanee nel paziente anziano

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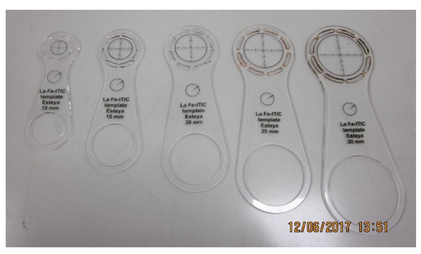
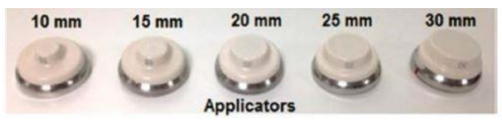
Aims:

Surface electronic brachytherapy (EBT) is a technique using miniaturized X-Rays source. It is gaining ground as an emerging alternative radiotherapy (RT) solution for small superficial skin cancers. It can also be used as an alternative treatment to surgery for selected patients (pts). This prospective, single-center, non-randomized, pilot trial shows the clinical implementation of a new EBT system named Esteya® evaluating dosimetric features, the clinical efficacy and safety of this approach. Preliminary results are presented.

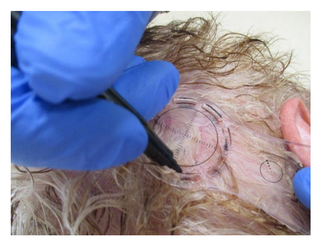


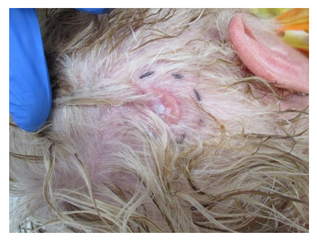


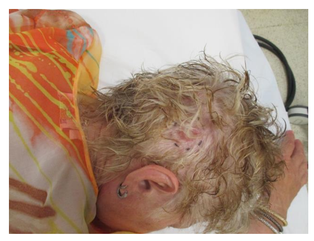
Methods:

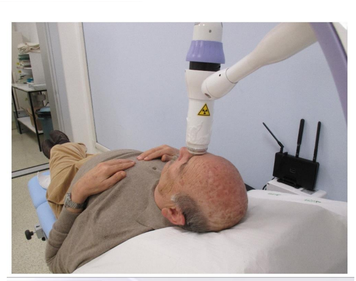
Flatness and symmetry of X-Ray beams have been evaluated using a high definition 2D array equipped of liquid filled ionization chambers. Half Value Layer (HVL), PDD and absolute dose have been measured for each applicator with a soft x-ray parallel plate chamber and solid water. Dose distributions have been compared with the ones calculated for conventional electron treatments (Fig.1). Between November 2016 and August 2018, 47 lesions of 36 consecutive pts (mean age: 78 years, range: 70-96) with non-melanoma malignant skin cancer have been enrolled and analyzed. Fifteen pts presented primary squamous cell carcinomas (SCC) of eyelids and scalp and 12.8 % recurrent SCC of the scalp and nose, 10.6 % showed recurrent basal cell carcinomas (BCC) of the nose and forehead, 44.7 % BCC of nose and temporal area. Only lesions with a maximum diameter < 2,5 cm were treated with radiation dose of 40 Gy (5 Gy fraction, 2/week). Acute toxicity has been measured according to CTCAE (Common Terminology Criteria for Adverse Events) v4.03 scales and RTOG-EORTC scales were used to assess cosmetic results.

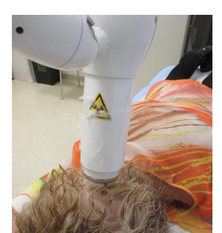
Patient characteristics	%
SCC of eyelids and scalp	31.9
Recurrent SCC of scalp and nose	12.8
BCC of nose and forehead	44.7
Recurrent BCC of the nose	10.6





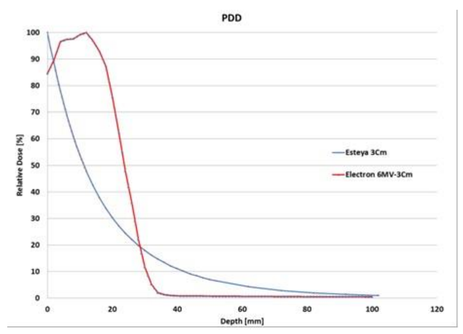


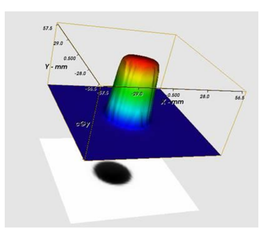


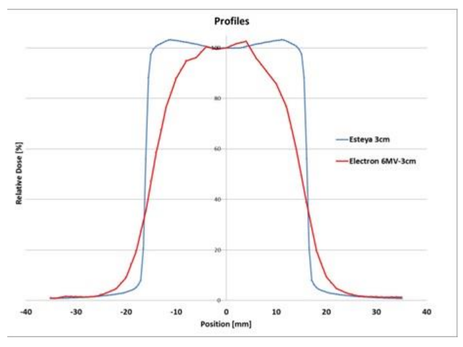


Results:

Flatness, symmetry and penumbra showed excellent performance even if compared with eMC plans. Build up absence and PDDs slopes allow good homogeneity for coverage in superficial targets. All pts underwent clinical examination and photographs during RT, 4 weeks, 8 weeks, 3 months, and 6 months after treatment. Toxicity started after the 4thfraction and worsened between the end and 4-6 weeks after RT. All pts presented erythema: moderate to brisk grade was scored in 66% cases (G2 CTCAE). Moist desquamation and crusting were shown by 6 pts, 2 patient presented moderate edema. Late toxicity was scored in 42.4 % pts: 10 pts showed slight pigmentation changes (G1 Late RTOG-EORTC) and 4 pts presented moderate telangiectasia (G2). No residual pain has been scored at the site of irradiation. A clinical complete response was observed in 95.7% of cases at 3 months, 2 patient presented residual disease at 3 months. After a median follow up of 6 months (1-21 months), local control rate is 95.6%: 1 patient experienced in-field recurrence at 6 months and one patient marginal recurrence at 4 months.

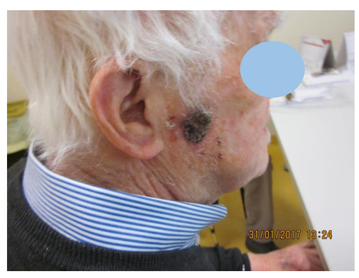




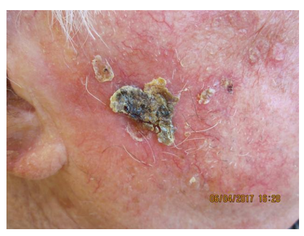


Toxicity (only G1- G2, no G3 or G4)	%
Erythema (moderate to brisk grade)	66
Moist desquamation and crusting	14,2
Slight pigmentation changes	21.2
Moderate telangiectasia	8

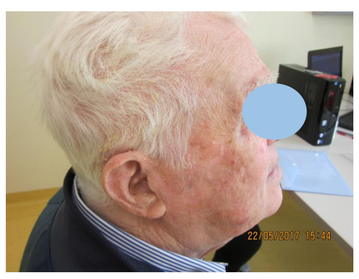
Results	%
CR (Complete Response)	95,6
Local control rate	95.6
In field recurrence	2.2

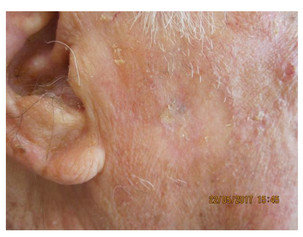


Pre-BRT



4 weeks post-BRT





3 months post-BRT

Conclusions:

Our preliminary results show that Esteya® is an effective, simple, safe, and comfortable treatment associated with good cosmetic outcomes for elderly patients with skin cancer. Even if a longer follow-up and a bigger sample size are needed to confirm these preliminary findings, shielding requirements, patient compliance and global management of EBT make this treatment modality an attractive alternative solution for elderly patients.