Dermatologic Radiation Therapy ◇

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The first-line treatment of dermatological tumors is excision. If this is not possible due to a specific localisation (e. g. eyelid, nose, ear), where surgical treatment requires maximum efforts of plastic surgery or where surgery leads to poor cosmetic results or malfunction, the treatment of choice is soft x-ray irradiation. The decision on surgery or irradiation has to be made for each patient individually and depends on age and subjective attitude of the patient, type and location of the tumor, and other medical conditions that might interfere with surgery.

For radiation therapy in dermatology usually soft x-rays (20-50 kV) are applied. The half-value depth (HVD) in tissue is between 0,5 and 15 mm. The HVD is adjusted to the desired penetration depth by voltage, filtration and focus-skin-distance (FSD), to total dose and biological response. Surrounding tissue is protected by lead shields of 1-2 mm thickness. General radiation protection measures are applied. A safety margin of 5-10 mm is added to the tumor delineation.

Radiation therapy in dermatology is indicated in superficial malignant tumors (squamous cell carcinoma SCC, basal cell carcinoma BCC, Bowen‘s carcinoma, Mycosis fungoides, extramammary Paget‘s disease, Kaposi‘s sarcoma), premalignant epidermal tumors (actinic keratosis, Bowen‘s disease, erythroplasia of Queyrat, lentigo maligna [in situ melanoma]), benign tumors (keratoacanthoma, keloid, lymphocytoma) and benign dermatoses (antiinflammatory radiation in acute dermatoses, psoriasis, dermatitis, active Dupuytren‘s disease, "malignant" Dupuytren, active Peyronie‘s disease). Except from lentigo maligna, malignant melanomas and sarcomas should not be irradiated in the first line, because of their high potential to metastasise and because of the fact that radiation resistant cell lines may be present.

Dermatologic soft x-rays are easy to apply and inexpensive. It is, however, not possible to administer a homogeneous dose to a tumor. To reach a certain tumor dose at the base of the tumor, the tumor surface is exposed to the double dose. Subtumoral structures (e. g. salivary glands, cartilage, mucous membranes, nerves) will also be exposed to significant doses, which may lead to malfunction or ulceration.

Proton irradiation guarantees a homogeneous and exact dose distribution with a definite maximum range so that the whole target is covered with an optimal dose and the subtumoral tissue remains unaffected. To optimise dermatological radiation therapy further investigations on proton radiation are necessary.

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