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A huge infiltrating squamous cell carcinoma of the neck 46 years after radiotherapy of a haemangioma

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Abstract

Background: There is a higher risk for malignant tumours in patients who underwent any kind of radiotherapy.

Main observations: An 87-year old patient with an extended squamous cell carcinoma of the neck was referred to our hospital. The large ulcerated tumour showed a deep infiltration of the para-vertebral muscles and the spinal processes C6-C7. The tumour was known since about six years and appeared about 46 years after low-dose radiotherapy of a cervical haemangioma of the neck in 1961. The large dimension of the tumour leaded to a radical surgical removal and a sufficient fast reconstruction strategy. The extended defect was covered by a pedicled lower musculocutaneous trapezius flap. No postoperative complications like partial necrosis, infection or movement disorders of the shoulder or a shoulder drop syndrome were seen. Ten weeks after the operation the patient showed a good functional and aesthetic result with no limitation of arm mobility. Two and a half years after radical intended surgery the patient was still alive and showed no recurrence of the tumour.

Conclusions: In conclusion there is a need for a life-time lasting dermatological supervision in patients with a history of radiotherapy in the past, because the handling of patients with such an enlarged tumour is complicated.

Introduction

Human evidence that ionizing radiation is carcinogenic first came from reports of non-melamoma skin cancers (NMSC) on the hands of workers using early radiation devices. Since this time it is a matter of common knowledge that the development of skin neoplasmas is one of the most important chronic complications of radiation therapy.[1] The most common NMSC's are the basal cell carcinoma (BCC) and the squamous cell carcinoma (SCC) of the skin. Clinical retrospective studies showed a strong association of the therapeutic radiation with basal cell carcinoma (BCC) in or near the radiation field, 10-20 years, sometimes even up to 46 years after radiotherapy.[1-3] A clear association of squamous cell carcinomas (SCC) on permanent or high dose radiated skin is even known since more than 65 years.[4] All in all it is not clear whether there is a significant association between the delayed appearance of SCC and the low-dose radiotherapy of benign tumours of the skin. The long time distance between the low dose radiotherapy and tumour-appearance complicates the clinical follow-up.[1,5]

In this report a case was presented that is remarkable for some reasons. First, this SCC presented with an uncommon long time of growth in the posterior neck region with a deep infiltration of the surrounding muscles and spinal processes C6-C7. Secondly, this is an example for a delayed damage of the epidermal cells, possibly caused by the low-dose radiotherapy of a haemangioma of the neck, 46 years ago. Third, because it is has been operated under curative aspects and demanded a fast and reliable reconstruction strategy. Because of the reduced general condition of the patient and the pre-stressed receptor area, by chronic inflammation and former radiation, a pedicled lower trapezius was chosen. The postoperative outcome showed good functional and aesthetic results.

Case report

An 87-year old female patient presented to the Department of Maxillo-Facial Surgery of the University of Halle-Wittenberg (Fig. 1) with an enlarged, ulcerated tumour of

the neck. This super-infected, necrotic tumour of the neck was enlarged up to a size of 12.0 x 8.5 cm since the last 5 years. Palpation detected no suspicious regional lymph nodes.

The first consultation in our clinic was due to the intensive wound management for the patient. In the medical history there was radiotherapy of a cervical haemangioma in 1961 with strontium contact irradiation.

Figure 1

Clinical aspect of the large squamous cell carcinoma (SCC) with inflammation and teleangiectasia on the circumference, 46 years after radiotherapy of a haemangioma. The dimension of the tumour was 12.0 x 8.5 cm and demanded a resection with more than 2 cm distance to the tumour front.

Computed tomography detected a deep infiltration of the subcutaneous tissue, the para-vertebral muscles up to the spinal processes C6-C7, which were affected by tumour erosion. There was no evidence of any lymph node manifestation.

In histological analyses the diagnosis of a moderate differentiated squamous cell carcinoma was confirmed and therefore the tumour excision was done radically with a safety distance of 2.0 cm in all tree dimensions. Therefore the spinal processes of C6-C7 and the para-vertebral muscles needed to be removed totally. The resulting defect showed a dimension of 18.0 x 14.0 cm.

The large defect dimension, the pre-stressed receptor area and the reduced general condition of the patient (ASA III, NYHA II) demanded a sufficient, time-saving and reliable reconstruction strategy. The considered reconstruction strategy was the transposition of a pedicled lower musculocutaneous trapezius flap. Other axial patterned flaps, like the latissimus-dorsi or pectoralis-major flap would not reach the defect area and cover the large defect of about 150 cc.[6,7] No postoperative complications, like partial necrosis, infection, movement disorders of the shoulder or a shoulder drop syndrome were seen. The postoperative outcome showed a good functional and aesthetic result (Fig. 2) with no limitation of arm mobility.

The final histological examination showed all margin sections clear and no tumour remnants were reported.

Two and a half years after radical intended surgery the patient was still alive and no recurrence of the tumour was seen.

Figure 2

Aesthetical pleasant and functional good result without any deficit in shoulder or arm movement eight weeks after radical surgery. No bulkiness, no partial necrosis or infection was seen.

Discussion

The development of a squamous cell carcinoma (SCC) of the skin is associated with different risk factors. Therefore the exposure to ultraviolet radiation is the most common cause of this type of cancer, but several other factors even promote the development of a SCC on the skin.[2,3,8,9] Ionizing radiation has also been implicated in the pathogenesis of squamous-cell carcinoma. In the 1940s and 1960s ionizing radiation was used to treat many cutaneous conditions, including acne, dermatitis and haemangioma.[8,9] The most patients treated with radiotherapy for such a benign tumour were children with a haemangioma in the head and neck. While these treatments generally were effective they resulted in enhanced cancer risks and the use of radiotherapy for benign disease has declined.

The development of basal cell carcinomas (BCC), in a time delay of 20 to 40 years, showed a strong association with the history of radiation treatment in clinical studies.[2] For the development of BBC's a strong association within the radiation treatment field and the age of the patients treated with radiotherapy, before the age of 20, is recently known.[6]

The same risks were also described for the development of SCC of the skin, although there were in generally smaller odds ratio.[2,4]

In this case the history of radio-therapy of a haemangioma of the neck, 40 years ago, may be critical. In the first half of the 20th century the radiotherapy of haemangioma and other benign tumours of the skin was a common method.[4,8,9] The importance of the irradiation of haemangioma in early childhood diminished because of the high spontaneous regression of the haemangioma, located in head and neck area.[15] In follow-up studies over two to three decades the appearance of BBC was described with about 1.0% in the area of the former radiation field with a mean latency of 22 years after radiotherapy of a haemangioma. The appearance of BBC was depending on the surface skin dose. No BBC was observed for a skin dose below 10 Gy.[4] The appearance of a SCC in the former radiation field, 40 years after radiotherapy of a haemangioma in the neck was not described before, while infiltrative BCC's in this context have been mentioned before.[5]

The development of a deep infiltrating SCC after radiotherapy is not common and the latent period for radiation-induced skin cancer, between 20-40 years, is the problem for exact clinical and statistical evaluation.[9] This case is an example for the late adverse effect of the low-dose radiotherapy of a haemangioma.

The sociological structure and the problem of medical care in older patients is often the cause for the development of such large tumours. Preoperative staging procedures showed the possibility for curative resection, but respecting the general condition a simultaneous reconstruction with a reliable method was demanded. Therefore the use of a pedicled vertical musculocutaneous trapezius flap was chosen to keep operative risks and operation time down.[10] The defined and secure vascular supply and the flap-extension up to a dimension from 25 x 8-10 cm were the great advantages of this method. After the operation the patient showed a good functional and aesthetic result with no postoperative complications, like pneumonia or other complications.

After a follow up of two and a half years the patient was still alive, without any manifestation of the SCC.

Conclusions

The time-delayed appearance of malignant tumours, 20 to even 40 years after low dose radiotherapy, in the field of radiation is recently known. This delay even complicates any exact statistical evaluation of the risk for skin tumours after low-dose radiotherapy. In conclusion there is a higher risk for malignant tumours in patients who underwent any kind of radiotherapy and so a life-time follow-up should be demanded.

References

1. Karagas MR, McDonald JA, Greenberg ER, Stukel TA, Weiss JE, Baron JA, Stevens MM. Risk of basal cell and squamous cell skin cancers after ionizing radiation therapy. For The Skin Cancer Prevention Study Group. *J Natl Cancer Inst*. 1996; 18:1848-1853.
2. Karagas MR, Nelson HH; Zens MS, Linet M, Stukel TA, Spencer S, Applebaum KM, Mott L, Mabuchi K. Squamous Cell and Basal Cell Carcinoma of the Skin in Relation to Radiation Therapy and Potential Modification of Risk by Sun Exposure. *Epidemiology*. 2007; 18: 776-784.
3. Davis MM, Hanke CW, Zollinger TW, Montebello JF, Hornback NB, Norins AL. Skin cancer in patients with chronic radiation dermatitis. *J Am Acad Dermatol*. 1989; 20: 608-616.
4. Ron E. Cancer risks from medical radiation. *Health Phys*. 2003; 85: 47-59.
5. Eggers G, Flechtenmacher C, Kurzen H, Hassfeld S. Infiltrating basal cell carcinoma of the neck 34 years after irradiation of an haemangioma in early childhood. A case-report. *J Craniomaxillofac Surg*. 2005; 33: 197-200.
6. Aryian S. The pectoralis major myocutaneous flap. *Plast Reconstr Surg*. 1979; 63: 73-81.
7. Preston DS, Stern RS. Nonmelanoma cancers of the skin. *N Engl J Med*. 1992; 327: 1649-1662.
8. Lindberg S. Radiotherapy of childhood haemangiomas: from active treatment to radiation risk estimates. *Radiat Environ Biophys*. 2001; 40: 179-189.
9. Lindberg S, Karlsson P, Arvidsson B, Holmberg E, Lunberg LM, Wallgren A. Cancer incidence after radiotherapy for skin haemangioma during infancy. *Acta Oncol*. 1995; 34: 735-740.
10. Weiglein AH, Haas F, Pierer G. Anatomic basis of the lower trapezius musculocutaneous flap. *Surg Radiol Anat*. 1996; 18: 257-261.