Eur J Plast Surg (1992) 15:17–20

European Journal of Plastic Surgery

The deleterious effect of Solcoderm on malignant skin lesions

Y. Ullmann, R. Moscona, and I.J. Peled

Department of Plastic Surgery, Rambam Medical Center and Faculty of Medicine, Technion-Israel Institute of Technology, Haifa, Israel

Summary. Solcoderm is a solution which, in the past, was considered to be suitable for treatment of malignant and benign skin lesions. A group of 50 patients is presented, all of whom received Solcoderm therapy for malignant skin tumors. A consistent clinical and histological findings was observed in these patients: the recurrence was wider and more aggressive compared to the original lesion. In the light of our experience and a review of the literature, this treatment modality seems to affect only the superficial layers of the tumor, while the deep layers remain unaffected. The residual malignant cells tend to spread out beyond the limits of the original tumor. Consequently, the subsequent therapy required is more extensive. Both functional and aesthetic results are suboptimal.

Key words: Skin tumors – Basal cell carcinoma – Solcoderm – Recurrence

Solcoderm is a product developed by Dr. Mardi in USSR and distributed at present from Switzerland [7, 15].[1] It is a complex of organic and inorganic acids with copper ions, in a solution containing: nitric acid, acetic acid, oxalic acid, lactic acid and copper nitrate trihydrate. Solcoderm has been recommended for the topical treatment of benign lesions such as: dermatofibromas, hemangiomas, papillomas, verrucae, nevi, condylomas, keratoses and pilar cysts [2–4, 7, 9, 16]. Solcoderm has also been suggested as a satisfactory treatment for malignant skin lesions such as basal cell carcinomas (BCC) and squamous cell carcinomas (SCC) [1, 6, 7, 8, 12, 15, 16]. The use of Solcoderm became increasingly popular since it is easy to use, the aesthetic results are satisfactory, and no special equipment or surgical skills are required for its use. All these characteristics make Solcoderm attractive for both physicians and patients.

However, out of the many patients with malignant skin tumors referred to our clinic during the last 5 years, a specific group of patients with recurrent malignant tumors has been identified. All of them had one thing in common, previous treatment with Solcoderm for the primary malignant tumor with an initial satisfactory response to the Solcoderm treatment, represented by "clinical" disappearance of the primary lesion. In a short time, however, there was a recurrence which was more aggressive than the original lesion and was multicentric [13] or a metatypical variant.

These patients required wider surgical excision, which resulted in considerable functional and aesthetic impairment. Fifty such patients have been treated in our department during the past 4 years. The purpose of this paper is to warn others about the deleterious effect of Solcoderm when used for the treatment of malignant skin lesions.

Clinical material

During the past 5 years, among the many patients referred to our department with skin lesions, there have been 50 patients who have been previously treated elsewhere with Solcoderm for lesions diagnosed clinically as BCC or SCC. From reviewing the medical records of these patients, the following details were available: The mean age was 57.6 years (range: 29–87). The mean recurrence time was 14.9 months (range: 4–42 months). 94% of the lesions treated with Solcoderm were on the face. An average three treatments with Solcoderm were needed until "healing" of the original lesions was obtained.

From the details of size and site of the original lesions, it was obvious that all could have been excised and closed primarily. The recurrent lesions were operated on and the details of the procedures examined. In order to close the post-excisional defect, skin grafts were needed in 69% of the cases; in 23%, local flaps were used and in 8%, the defects were closed primarily. The mean follow-up after secondary surgery was 44 months (range: 30–60), 6 patients (12%) had further recurrences. Four representative cases are presented.

Patient 1

A 67-year-old man with multiple BCC's on his scalp had in the past been treated in our department by surgical excision. He was

[1] Solco Co., Basel, Switzerland

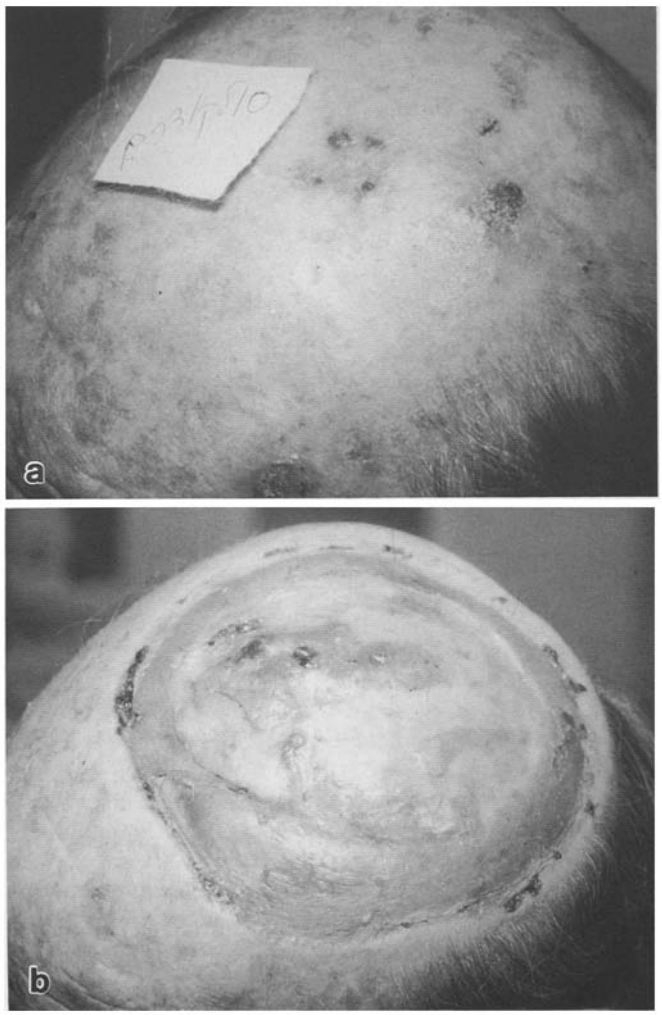

Fig. 1. **a** *Patient 1.* This shows the multifocal recurrence of the tumor. **b** Wide excision resulted in a large defect which required skin grafting

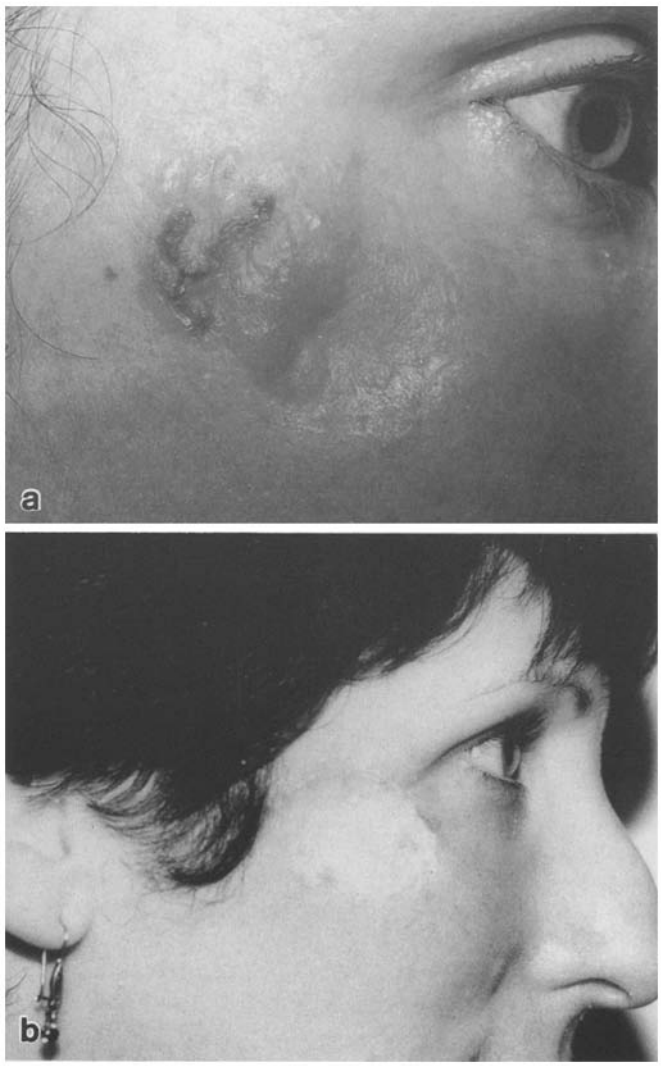

Fig. 2. **a** *Patient 4.* A large tumor recurrence on the zygomatic area after Solcoderm treatment. **b** Postoperative result, a skin graft was needed to close the skin defect.

then lost to follow-up and was treated elsewhere with Solcoderm being applied to two small new lesions in the center of his scalp. The treatment was repeated several times until complete clinical healing was observed.

Two years after this treatment, the patient returned to our clinic with a large local recurrence (Fig. 1a). An extensive excision with multiple intraoperative frozen sections was needed to remove the tumor. The defect, 8×10 cm was skin grafted (Fig. 1b). Histological examination revealed multicentric BCC. After a 2 year follow-up, the area is free of tumor.

Patient 2

A 33-year-old woman was treated elsewhere with Solcoderm for a suspected BCC in her left temporal area. She received 4 treatments over a period of 18 months. After an 18 month disease-free interval, the patient was referred to our clinic with a local recurrence at the periphery of the previously treated area.

The lesion was widely excised. Multiple intraoperative frozen sections revealed the need for wider excision. When this was done, there was a residual defect 5 cm in diameter with its medial border close to the lateral canthus; the defect was skin grafted. Fourteen months later, there was a recurrence on the lateral edge of the skin graft. The area was widely excised and skin grafted. Three and a half years later, she is disease-free but has a poor aesthetic result.

Patient 3

A 50-year-old patient with multiple BCC's was treated in the past in our clinic by surgical excisions of cystic and nodular BCC's. Two new lesions on the neck and back were treated with Solcoderm.

The patient recorded disappearance of both lesions after treatment. When the lesions recurred, he was again referred to our clinic. Following excision, the histological diagnosis was multicentric BCC. Five years later, the patient is disease-free.

Patient 4

A 30-year-old woman was treated 5 years ago for a large BCC on her zygomatic area by excision and skin grafting. Two years later, a small nodule appeared on the edge of the grafted area.

This small recurrence was treated with Solcoderm and according to the patient, the lesion disappeared. However, several months later, an extensive recurrence was noted, and she was again referred to our clinic (Fig. 2). Wide excision and skin grafting was performed (Fig. 2b). Histology revealed multicentric BCC. After 32 months follow-up, there has been no further recurrence.

Discussion

The incidence of malignant skin lesions is constantly increasing, the goals in treating these tumors is to eradicate the lesion with minimal damage to the surrounding healthy tissue and to obtain the best possible aesthetic and functional results. Although conventional surgical excisions are commonly used, some physicians prefer other modalities; mainly, freezing, electrocautery, laser, topical application of 5-fluorouracil, azelaic acid, or Solcoderm. Unless a biopsy has been taken, the main drawback of these modalities is a lack of histopathological confirmation of the clinical diagnosis, and there is no confirmation of tumor eradication.

Solcoderm was initially reported outside the USSR in 1979 [7]. It fixes the treated tissue directly; when the devitalized tissue dries up in 2–5 weeks, it separates as a crust [6, 8, 12]. The treated areas heal with minimal scarring giving the impression of complete healing and total eradication of the malignant lesion [8].

Until now, most publications strongly recommend this preparation for treatment of both benign and malignant skin lesions [1–4, 6–9, 12, 15, 16].

We do not disagree about the good results obtained with Solcoderm in treatment of benign lesions, but in the light of our experience, we are critical of publications recommending the use of Solcoderm for malignant lesions.

The initial publication [7] described 29 patients with BCC's treated with Solcoderm; all healed completely, and of the 7 patients with SCC's, 5 did well. However, these results were too preliminary, the follow-up being only one year, and there was no histological examination.

Labhardt [12] used Solcoderm in 38 patients with BCC. Good results were obtained in 28 cases, during a 5–21 months follow-up. It should be noted that the recommended follow-up time is 5 years. He advised that only superficial BCC should be treated with Solcoderm.

Engelberg et al. [8] performed deep biopsies in treated areas and found residual tumor in 66% of the cases. This incomplete eradication of the tumor was found mostly in lesions thicker than 0.5 cm or in morphea form tumors.

Based on the above findings, incisional biopsy is recommended before treatment with Solcoderm in order to define the type and depth of the tumor. However, this somewhat negates the main advantage of using Solcoderm, which aims to be a nonsurgical procedure.

Experience in a group of 50 patients treated elsewhere with Solcoderm for malignant skin lesions who presented with local recurrences is presented. All of the recurrent lesions showed a common pattern of behaviour; most of them were larger than the original tumor,

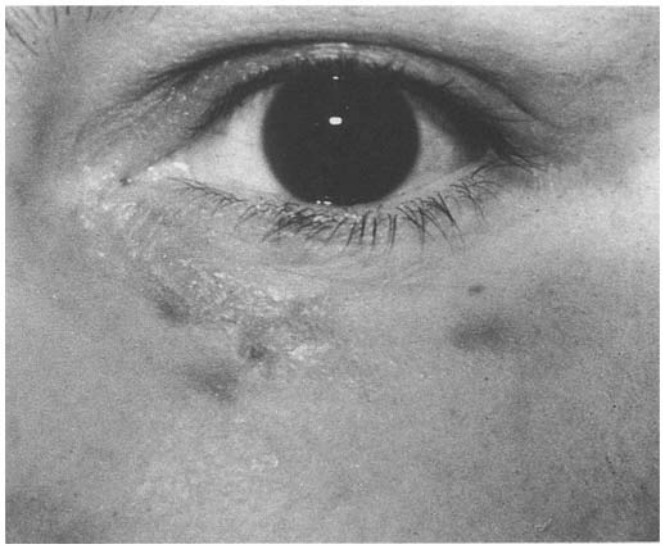

Fig. 3. The multifocality of the recurrent BCC post-Solcoderm treatment is well demonstrated in this 38-year-old woman. The tumor occupies most of the lower lid

and they appeared several months or years after post-treatment disappearance of the tumor. The clinical behaviour seemed to be more aggressive, and the histological pattern was, in most cases, either multicentric or metatypical [13]. This necessitated more extensive excisions and more complex reconstructions, some requiring general anesthesia. The aesthetic and functional results were suboptimal.

This unfortunate consequence is probably due to the fact that Solcoderm destroys only the malignant cells in the superficial layers. Healing of the partially treated areas with scar and epithelization gives the impression that a complete cure has been obtained. However, the remaining malignant cells continue to proliferate and months or even years later will spread out through the scar into the adjacent tissues. Most malignant lesions of the skin can be excised primarily with cure rates of up to 95%. Mohs micrographic surgery is another treatment modality which can be extremely effective in the curative resection of malignant lesions [5], both primary and recurrent. The surgical excision needed to eradicate recurrent tumor after Solcoderm treatment is always wider than estimated clinically. This is perhaps due to the multicentricity of the tumor (Fig. 3).

In such cases, Mohs micrographic surgery [5] or multiple intraoperative frozen sections are advised, since previous treatment of BCC no matter what method has been used, significantly lowers cure rates [10]. The biological changes and behaviour of the tumor after Solcoderm application is reminiscent of the post-radiation recurrence seen in malignant skin lesions. One may speculate as to whether Solcoderm, like irradiation, interferes with tumor-host relationship which enhances tumor virulence [11].

Although our follow-up after secondary resection is still too short for final conclusions, our 12% recurrence rate is high, and it will probably become higher with

time. This may be further proof of the greater invasiveness of these altered tumor cells.

In conclusion, based on our experience and on a review of the literature on this subject, malignant lesions of the skin should not be treated by Solcoderm. When the diagnosis is in doubt, the physician should perform fine needle aspiration (FNA) [14] or incisional biopsy to rule out malignancy. There is no contraindication to treat benign lesions with Solcoderm.

References

1. Binet O, Cesarini JP, Bruley C, Aron-Brunetiers R (1984) Differential aspects of Solcoderm therapy as a function of dermatologic diagnosis. Dermatologica 168(S1):58
2. Brenner S (1986) Treatment of pilar cyst with Solcoderm solution. Am J Acad Dermatol 14:145
3. Brokalakis J, Goumouzas N, Varelzidis A (1984) Topical treatment of condyloma acuminata with Solcoderm. Dermatologica 168(S1):49
4. Burri P (1984) Treatment of nevi and warts by topical chemotherapy with Solcoderm. Dermatologica 168(S1):52
5. Casson PR, Robins P (1990) Mohs micrographic surgery. In: McCarthy JG (ed) Plastic surgery, vol 5. Saunders, Philadelphia, p 3652
6. Cesarini JP (1984) Histopathologic and electron microscopic studies of the effects of Solcoderm on normal epidermis and superficial cutaneous tumors. Dermatologica 168(S1):15
7. David M, Sohar E, Mardi S (1979) Treatment of non-malignant and malignant skin tumors with preparation 5577. Harefuah 96:1
8. Engelberg IS, Meyer R, Suster S, Schewach-Millet M et al. (1986) Effects of Solcoderm. Int J Dermatol 25:606
9. Feuerman EJ, Katznelson V, Halevy S (1984) Solcoderm in the treatment of solar and seborrheic keratoses. Dermatologica 168(S1):33
10. Hayes H (1962) Basal cell carcinoma: the East Grinstead experience. Plast Reconstr Surg 30:273
11. Hirshowitz B, Mahler D (1971) Incurable recurrences of basal cell carcinoma of the mid-face following radiation therapy. Br J Plast Surg 24:205
12. Labhardt WC (1968) An overview of clinical experience with Solcoderm. Dermatologica 168(S1):31
13. Lever WF, Lever GS (1983) Basal cell epithelioma. In: Histopathology of the skin, 6th edn. Lippincott, Philadelphia, p 573
14. Malberger E, Tillinger R, Lichtig C (1984) Diagnosis of basal cell carcinoma with aspiration cytology. Acta Cytol 28:301
15. Ravid M, Sohar E, Krispin M, Mardi S, Semach D (1984) Long-term (5–8 years) follow-up of Solcoderm-treated malignant skin tumors. Dermatologica 168(S1):63
16. Schewach Millet M, Azizi E, Semach D (1984) Cumulative experience with Solcoderm in the treatment of basal cell epithelioma. Dermatologica 168(S1):43