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Skin haemangioma: Treatment by cryosurgery

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Cryosurgery has been applied for the treatment of planotuberous haemangiomas. In 270 patients, the procedure proved entirely successful and no complications were observed in any of the cases. The use of cryosurgery is recommended for the treatment of planotuberous lesions of the head and neck.

Haemangiomas are tumours of the blood vessels. The blood vessels proliferate by producing a vascular network separated from the surroundings. The majority of vascular tumours manifest at birth or during the first months of life. Their development is attributed to histogenetic disorders and they are mostly observed at the closure lines of fetal clefts, the majority in the innervation area of the fifth cranial nerve, but they may appear all over the body. In practice, the clinical classification of Schnyder (7) has been generally accepted.

1A. Haemangioma plano-tuberosum (strawberry mark)

1B. Haemangioma tubero-nodosum (cavernosum)

2. Angioma senile (De Morgan spot)

3. Haemangioma-pericytoma

4. Multiple haemangiomatosis (infantile)

5. Blue rubber bleb naevus

6. Haemangioma associated with different syndromes (Kasabach–Merritt syndrome, Mafucci–Kast syndrome, Sturge–Weber syndrome).

In our material, all these forms have been observed but the present paper is devoted only to the most common of the vascular naevi, the plano-tuberous haemangioma.

Plano-tuberous haemangioma or strawberry mark is a red or purplish-blue sharply demarcated tumour of the skin or the mucosa (Fig. 1). It is composed histologically of tightly adjacent capillaries filled with blood and divided into islets by interstitial septa. As to their localization, more than 50% occur in the head and neck regions (7). In a material of 1446 patients with haemangioma the tumour was on the skin or the mucous membranes of the head and neck in 55% of the cases. In our material, 65% of the strawberry marks were on the head, the face or the mucous membranes of these regions.

The growth pattern of plano-tuberous haemangiomas during the first 6 to 8 months of life is variable. After that time, growth usually ceases, the capillaries in the tumour become fibrotic, the tumour shrinks and in 80–90% of the cases disappears by the age of 10 years.

Therapy

There is no generally accepted treatment of haemangiomas. In evaluating the results of treatment and in weighing the indications for it, many authors are of the opinion that one should wait and see whether or not the tumour will tend to recede or even disappear entirely in the course of years (6). In the case of haemangiomas of the head and neck, this attitude is inacceptable in view of the disfiguration the young child has to tolerate.

Traditional Methods

For long decades the traditional methods of treatment used to be surgery or radiotherapy or their combination.

Surgical therapy of haemangiomas is done by radical extirpation or electrocoagulation, by injection into the tumour of some sclerosing agent, or, in suitable cases, by ligation of the growth. In the case of giant haemangiomas with arterio-venous shunt, surgery is the only solution, although it may present difficulties. Giant haematomas are not amenable to cryotherapy.

Radiotherapy. X-ray irradiation may have a favourable effect on planotuberous haemangiomas. In certain head and neck tumours, however, X-ray therapy is contraindicated due partly to technical and partly to developmental reasons.

Cryotherapy

Cryotherapy denotes an intervention which, by local cooling, results in a controllable destruction of living tissue.

The use of cold in medicine goes back to ancient Egypt (8) where it was applied for local treatment of injuries and inflammations. In modern times, some 60 years ago, dry ice was recommended for the therapy of some skin diseases (10). The year 1961 was a milestone in the history of cryotherapy when an efficient cryosurgical apparatus working with liquid nitrogen was constructed (1, 2). It was first used for stereotactic thalamectomy and then for the destruction of benign and malignant brain tumours. Since then, successful and often spectacular results have been achieved by cryotherapy in diverse fields (4, 5, 9, 11).

The direct effect of cryotherapy consists in destruction and dehydration of cells, in changing the concentration of electrolytes, inhibition of cellular enzymes, and denaturation of lipoproteins (3, 9). In addition, cryotherapy has certain indirect effects such as inducing congestion, stasis, thrombosis and occlusion of vessels, further certain immunological actions such as formation of antitumour antibodies (9).

Cryotherapy offers many advantages over surgical and other methods of tissue destruction. It causes no inconvenience or pain to the patients and, therefore, can be performed without anaesthesia; it can be done

FIG. 1. Haemangioma plano-tuberosum
FIG. 2. Haemangioma on the tip of the nose
FIG. 3. Same patient after treatment

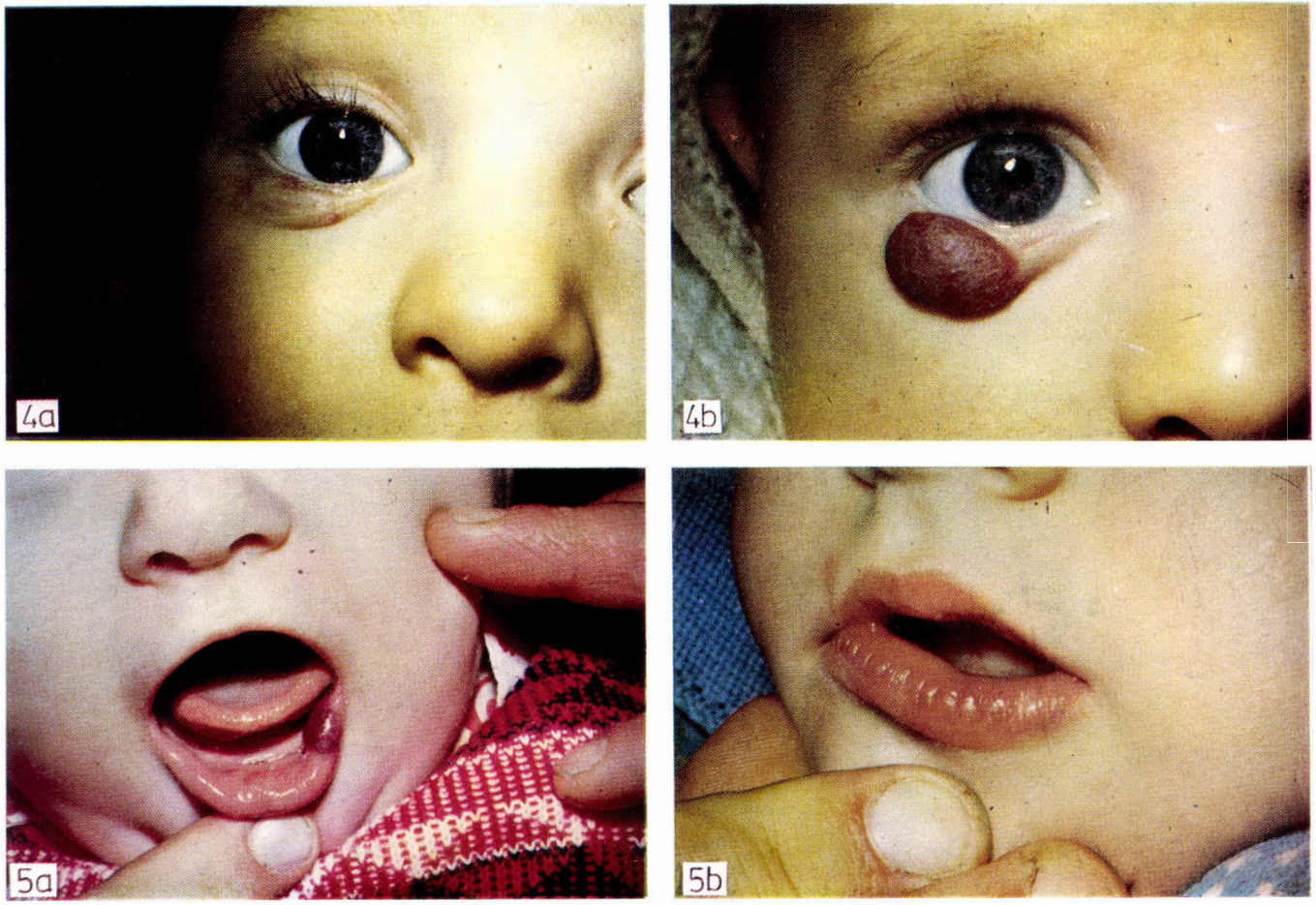

FIG. 4. Haemangioma on the right lower eyelid, and same patient after treatment
FIG. 5. Haemangioma on the lip, and same patient after treatment

on out-patient basis; there is no age limit and there are hardly any complications; the extent of tissue destruction induced is precisely predictable; it can be repeated according to necessity, and the wound caused by it heals without any scar.

Own Results

For treatment, the Cryo-P or the high-power Cryo-Amoils 40A (Erbo, Tuttlingen, GFR) has been used. In our experience, to reach the best results, a cooling rate of 5°C per sec and a final temperature of between −20 and −38°C had to be observed. The treatment was repeated several (4 to 8) times depending on the size and localization of the haemangioma, in intervels of 15 days when the hyperaemia and bullae caused by the intervention had already healed.

The original haemangiomas and the results of the therapeutic procedure are shown in Fig. 2 to 5.

Discussion

As seen from the figures, cryotherapy resulted in an unequivocal and definite recovery, i.e. the total disappearance of haemangiomas. We have not observed any complication in any of our 270 cases. The intervention caused no haematoma or bleeding that is unavoidable with the traditional surgical techniques. From the cosmetic point of view, the result was always fully satisfactory. There were no pathological consequences of the cooling even at those sites (lower and upper eyelids, lips, tip of the nose, nasal meatus, fontanelles) which are inaccessible to any kind of traditional treatment. In our opinion,

Table I

Distribution of 270 patients with haemangioma localization

Child	237 (86%)	Head and neck	192 (81%)
		Other	45 (19%)
Adult	33 (14%)	Head and neck	22 (67%)
		Other	11 (33%)

Table II

Age distribution of 237 children with haemangioma

Months	1	2	3	4	5	6	7	8	9	10	11	12
No. of patients	10	26	30	24	24	25	16	14	10	8	7	8
Years	15	2		3	5							
No. of patients	18	12		4	1							

cryotherapy has great advantages and is more effective in the case of haematomas than in any other treatment applied so far.

References

1. Cooper, AS, Lee, RS: Stereotactic thalamectomy by deep cooling. In: *Handbook Cryosurgery*, ed. Ablin, RJ, Marcel Dekker, New York 1980
2. Fasano, BL, Lee, RS: Removal of brain tumors by cryosurgery. In: *Handbook of Cryosurgery*, ed. Ablin, RJ, Marcel Dekker, New York 1980
3. Hausamen, JE: The basis, techniques and indication for cryosurgery in tumors of the oral cavity and face. *J Maxillofac Surg* 3:41, 1975
4. Holden, HB: Cryosurgery: its scientific basis and clinical application. *Practitioner* 210:543, 1973
5. Leopard, JE: Cryosurgery and its application in oral surgery. *Br J Oral Surg* 13:128, 1975
6. Schnyder, WU: Sollen die kapillaren Hämangiome des Kindes behandelt werden und wann und wie? *Z Kinderchir* 3:445, 1966
7. Schnyder, WU: Haemangiome. *Dtsch Med Wochensch* 94:1990, 1969
8. Sguazzi, A, Bracco, D: A historical account of the technical means used in cryotherapy. *Minn Med* 65: 3718, 1974
9. Shulman, S: *Cryosurgery*. Thomas, Springfield, Ill. 1968
10. Sladkovich, SE: On the history of cryotherapy in dermatology. *Acta Dermato-Venereol (Stockh)* 41:492, 1961
11. Smith, RM, Stetson, JB: *Therapeutic Heat and Cold*. Licht, New Haven, Conn. 1965

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