- (5) Ewers R, Härle F: Ist die operative Verschleppung von Tumorzellen möglich oder vermeidbar? Fortschr Kiefer Gesichtschir 1985;30:175-176.
- (6) Gerster AC: On the surgical dissemination of cancer. N Y Med J 1885;41:233-236.
- (7) Grundmann E: Keine Metastasenförderung durch Biopsien. Dtsch Ärztebl 1979;11:699-702.
- (8) Harris AH, Smith RR: Operative wound seeding with tumor cells: its role in recurrences of head and neck cancer. Ann Surg 1960;151:330-334.
- (9) Hollmann K: Persönliche Mitteilung.
- (10) Howard JM: Studies of autotransplantation of human cancer. Surg Gynecol Obstet 1963;117:567-573.
- (11) Lack HL: Contribution to operative treatment of malignant disease of larynx with special reference to danger of cancerous wound infection. Lancet 1896;1:1638-1641.
- (12) Mahaffey PJ, Sommerlad BC: Tumor spread in a delto-pectoral pedicle flap used in reconstruction of the lower jaw. Br J Plast Surg 1985;38:43-45.
- (13) Nadler SH, Moore GE: Autotransplantation of human cancer. J Am Med Ass 1965;191:117-129.
- (14) Robbins KT, Woodson DE: Chest wall metastasis as a complication of myocutaneous flap reconstruction. J Otolaryngol 1984;13:13-14.
- (15) Ryall C: The technique of cancer operations with reference to the danger of cancer infection. Br Med J 1908;1005-1008.
- (16) Salzman RS, Bennett RG, Fleischer AS: Cutaneous implantation metastasis complicating a superficial temporal - middle cerebral artery anastomosis. Neurosurg 1982;11:268-270.
- (17) Saphir O: The transfer of tumor cells by the surgical knife. Surg Gynecol Obstet 1936;63:775-776.
- (18) Schouten JT: Tumor implantation in a skin flap. J Am Med Ass 1983;250:2670-2672.
- (19) Sherman JE, Urmacher C, Lane J, Chaglassian T: The use of cross-leg flap in malignancy. Plast Reconstr Surg 1981;67:230-233.
- (20) Southam CM, Brunschwig A: Quantitative studies of autotransplantation of human cancer. Cancer 1961;14:971-978.

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Invited Commentary: "Implantation Metastasis at the Donor Site of a Myocutaneous Flap – Case Report and Review of the Literature"

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The question of metastasis developing as a consequence of surgical implantation is a very interesting one. It is interesting as a rarity, and exciting too, because a certain medical responsibility is involved in the background. The physician performing therapy by removing a tumour at the same time implants another tumour. It is not surprising that the recent publications dealing with this topic generally devote considerable space to the preventive measure taken during operation (wound washing, changing gloves and clothing, etc.) (1, 4, 5).

It is interesting to observe that, virtually without exception, the cases reported in recent years relate to large, extensive operations (2, 8, 9). The defect remaining following the removal of the tumour is closed by means of various flaps, and the tumour implantation occurs on the donor site of the flap. From more than 100 flap operations of this type, only in one did Kermer et al. (4) observe an implanted metastasis on the donor site.

The cause may include the weakened organism, and the immune suppression caused by the irradiation and the chemotherapy. However, we have not found any publication which describes only preoperative chemotherapy. The reason why we wish to stress this is that we have not observed any implantation metastases after several hundred preoperative treatments involving systemic or regional cytostatics before extensive tumour surgery.

It would be interesting perhaps to investigate the degree of malignancy of the implanted tumours. In the case mentioned above, the patient received a dose of 50 Gy as preoperative treatment. It is striking in the case of the patient reported above that there were a number of local recurrences, and the immunological condition of the patient was therefore certainly very poor.

During the theoretical search for the reasons, the idea arises that not only the "weakened" patient, but also the current blood supply problems of the tissues may play a role as concerns the survival of the implanted tumour cells. Németh et al. (3) reported

a case where a tumour developed in a cylindrical flap applied for palatal replacement, 15 years, after exstirpation of the primary tumour. As a cause, they postulated the scar tissue with its poor blood supply.

The discontinuous spreading of tumours may involve lymphogenic, hematogenic or dissemination on a serious membrane basis, or implantation as a result of some manipulation. This latter possibility is very rare, but it cannot be completely prevented, no matter how careful the surgeon is during the intervention. Under certain conditions, Ackermann (1) considers that it may be avoided, however, because of its rarity, it is difficult to prove that implantation metastases indeed occur more rarely because of the caution, or for some other reason (good fortune?). Krokowski (6) view this question much more pessimistically. He considers that, even with the best-planned tumour treatment, the possibility of implantation metastases must be reckoned with in the unsuccessful cases. He mentions the immunological state after irradiation as a definite and "unavoidable" cause.

Perhaps one of the most important observations and experiments connected with the question stems from Nadler and Moore (7). Tumour autotransplantations were performed on 82 incurable volunteers. At the same time, homogenized autologous tumour cells were implanted into the same patients. They made observations of the length of incubation, the growth rate and the possible action of autogenous tumour transplants as an auto-vaccine. Tumour growth was detected in only 11 of the 82 patients. The shortest period of time from implantation to positive biopsy was 10 days, and the longest was 3 months, in 2 cases (7).

The paper by Koike et al. (5) also showed that autotransplantation of a solid tumour was responsible for implant metastases, while autologous tumour homogenates did not lead to growth. The factor which may influence autotransplantation of cells such as the site of implantation, viability, and number of cells transplanted, host resistance, and others still remain to be fully elucidated. Tumour viability and the number of cells implanted should not have been a factor for the failure of growths of the implants.

It is clearly evident from these studies and from those done by others that at this time a great deal of information is still unknown about the behavior of tumours and that much more work and experimentation needs to take place. Undoubtedly various host factors, not all of which may be of the classical immunity type, play a role in the host and these need to be elucidated, not only in the role of cancer, but also for the future success of organ transplantation from normal people.

References

- (1) Ackerman, LV, Wheat NW: The implantation of cancer – an avoidable surgical risk? Surgery 1955;37:341.
- (2) Carr RJ, Gilbert PM: Tumor implantation to a temporalis muscle flap donor site. Br J Oral Maxillofac Surg 1986;24:102-106.
- (3) Németh Z, Gyenes V: Szájüregbe transzplantált szövetben kialakult rosszindulatú daganat. (Esetismertetés) Fogorv Szle 1993;86:193-196.
- (4) Kermer C, Pirkner W, Millesi W, Susanna Lang: Implantationsmetastase an der Entnahmestelle eines Myokutanlappens: Fallbericht und Literaturübersicht. Acta Chir Austriaca 1994;26:160-162.
- (5) Koike A, et al: Heterologous, Homologous and Autologous Transplantation of Human Tumors. Cancer 1963;16:1065-1071.
- (6) Krokowski E: Programmiert die Tumorthherapie auch ihren Mißerfolg? Strahlentherapie 1978;154:147.
- (7) Nadler SH, Moore GE: Autotransplantation of human cancer. J Am Med Ass 1965;191:117-129.
- (8) Mahaffey PJ, Sommerlad BC: Tumor spread in a delto pectoral pedicle flap used in reconstruction of the lower jaw. Br J Plast Surg 1985;38:43-45.
- (9) Robbins KT, Woodson DE: Chest wall metastasis as a complication of myocutaneous flap reconstruction. J Otolaryngol 1984;13:13-14.

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