It is suggested, therefore, that in view of the above advantages hyaluronidase be given routinely in deep insulin therapy, even though the benefits do not appear to be as significant as was initially thought.

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Medical Memorandum

Inheritance of Human Cancer: Five Cases in One Family

Several extensive surveys have been published with regard to the inheritance of cancer. Some important records of pedigrees, showing apparent transmission from mother to daughter, were published nearly a century ago. The most remarkable were those recorded by Broca (1866), in which four generations of females had cancer of the breast. It is a point of general agreement amongst recent authors that mammary cancer is familiarly transmitted—Penrose *et al.* (1948a, 1948b) and Smithers (1948) following Wassink (1935) and Jacobsen (1946). But here uniformity ends, and a divergence of opinion appears on the issue whether cancer of other sites is increased in frequency amongst relations of patients with carcinoma of the breast. By Busck's (1948) computations on Jacobsen's (1946) results it has been demonstrated that close relatives of patients with mammary cancer show a significantly increased number of cancer cases.

In the family reported below there seems to be strong evidence that cancer of the breast is familial and does predispose to malignant tumours of other sites.

In this family of 10 children three sisters developed carcinoma of the breast proved by hospital records (Cases 1, 2, and 3). Patient No. 2 had two children—a girl (Case 4) who had fibrosarcoma of the right mandible, and a boy (Case 5) who died from hepatoblastoma of the liver. There was no history of cancer in any near relation of the father or mother, and no blood relationship between the parents.

CASE REPORTS

Case 1.—This patient was a married woman. There is one daughter, aged 16, alive and well and unmarried. The patient underwent right radical mastectomy on February 7, 1946. Pathological report: (1) solid and trabecular polygonal celled carcinoma of breast; (2) carcinoma infiltration of skin and nipple (Paget's disease and subadjacent breast tissue); (3) carcinomatous infiltration of ducts and lymphatics in surrounding tissue; and (4) secondary carcinoma in four axillary lymphatic glands. Operation was followed by radiotherapy. The patient was readmitted with extensive multiple secondary deposits (spine, pelvis, femora), and died on April 23, 1947, aged 29.

Case 2.—This patient, a sister of Case 1 and the mother of Cases 4 and 5, married at the age of 23. There was no blood relationship between her and her husband. Her first child (female) was born on March 28, 1943, and her second child (male) on June 19, 1948. The mother still remained fit, and breast-fed her second child for nine months. In 1949 she developed a lump in her left breast and attended hospital. She was operated upon in November, 1949, for carcinoma of breast. The appearances at operation were typically those of a scirrhous carcinoma. Operation was followed by radiotherapy. She died on October 3, 1950.

Case 3.—The 34-year-old married sister of Cases 1 and 2 had one child, a girl aged 9. Hospital notes reveal that she had an anaplastic carcinoma of one breast removed on August 24, 1955, and an adenocarcinoma of the other breast removed on September 15, 1955. At the time of writing she was having radiotherapy.

Case 4.—The elder child of Case 2, born March 28, 1943, had had chicken-pox, measles, and tonsillitis. Her tonsils and adenoids were removed in 1952. She remained very well and was examined in July, 1955, when she was fit. On September 5, while on holiday, she developed a swelling on the right side of her face. She returned home and was treated by her own doctor. The swelling did not respond to treatment and she was admitted to hospital. Investigations showed that the lump was a spindle-cell tumour with the morphology of a fibrosarcoma of the right mandible. A course of x-ray therapy caused little diminution in the size of the tumour. When last examined (February 27, 1956) she had lost weight and had a large hard mass over her right cheek extending below the jaw, over the parotid to the ears, and causing limitation in opening of mouth.

Case 5.—The younger child of Case 2, born June 19, 1948, had had whooping-cough, measles, mumps, and chicken-pox. When examined at school on March 30, 1954, he was found to be suffering from recurrent tonsillitis and earache. There was nothing else abnormal, and he had been referred to an E.N.T. surgeon for his opinion. In July, while on holiday, he developed severe abdominal pain and was admitted to hospital, where a large mass was discovered in his abdomen. In August a very large hepatoblastoma, very malignant in type, was removed from the right lobe of his liver. He received deep x-ray therapy and recovered sufficiently well to attend school for a short period. He developed ascites in February, 1955, and died on March 26.

COMMENT

This is a family of which three daughters developed the same type of carcinoma of breast at a very early age (29, 28, and 30 years respectively). In the second generation two children of the second daughter developed cancer at an extremely early age (6 and 12 years respectively). The hereditary basis in this particular family is indicated by the appearance of the same cancer in three daughters and by the early onset of cancer in the first and second generation.

Note: Since writing this memorandum Case 4 has died.

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