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GARDNER'S SYNDROME AND THYROID CANCER—A CASE REPORT AND REVIEW OF THE LITERATURE

Sir—Gardner's syndrome (GS) is a familial condition consisting of adenomatous polyposis coli, mandibular osteomas and soft tissue lesions (6, 8). If the polyposis is not treated an adenocarcinoma of the colon develops in almost 100% of the cases at an unusually early age. In about 20% of the cases polyps are also detected in the periampullary region and may undergo malignant degeneration (7). Endocrine neoplasms have also been noted, specially thyroid cancer, both before and after the diagnosis of polyposis coli (2, 13).

In the present paper, a patient with GS and follicular carcinoma of the thyroid is reported and discussed. The case was discovered during a survey of a family with GS detected in 1983 in the province of Trento in northern Italy.

Case report. A 24-year-old woman (Figure) was first examined at the Surgical Department of the S. Chiara Hospital of Trento in November 1983. On December 3, 1983, the patient underwent total colectomy with ileo-rectal anastomosis because of adenomatosis coli. Radiograms of skull and mandible were normal as well as endoscopy and double contrast roentgen examination of the gastro-duodenal tract. The patient had supranumerary teeth. A diagnosis of GS was made.

At a second examination, performed at the Oncologic Department in September 1986, a solitary left-sided thyroid nodule, 10 mm in diameter, was discovered. The patient had never been exposed to ionizing radiations to head and neck. Two of her ancestors had died because of tyroid cancer, one papillary carcinoma (III-9, Figure) and one cancer with unknown histology (I-2, Figure). Thyroid function tests were normal. Thyroid scanning with $^{99}Tc^{m}$ pertechnetate revealed a 'cold' nodule in the lower third of the left lobe. Ultrasonography showed this nodule as a solid mass 6×12 mm, slightly less echogenic than normal thyroid tissue. Another smaller nodule (3×4 mm) was also detected in the upper third of the left lobe. Fine needle aspiration for cytologic examination of the first mentioned nodule revealed numerous non-cohesive epithelial cells of follicular type with slight cellular atypia.

On October 30, 1986, the patient underwent total thyroidectomy. The specimen revealed a well differentiated multicentric follicular carcinoma without invasion of the capsule. At present, the patient is well.

Patients with GS are at risk for a variety of extracolonic benign and malignant lesions which can occur both before and after the discovery of the colonic adenomatosis (13). A careful long-time observation is therefore necessary. The actual incidence of endocrine neoplasms in GS is unknown because these may be non-functioning or occult (12). Only autopsy studies on series of patients with GS could answer this question. Thyroid cancer is the most frequent endocrine neoplasms reported in such patients. In the literature 17 cases have been reported, including our own case (Table). The thyroid cancers have usually been detected in the third decade of life and the female–male ratio is 4:1. In most cases the tumors have been multicentric and papillary. In two thirds of the reported cases for which information was available, carcinoma of the thyroid preceded the detection of colonic polyposis with 7 to 10 years (3–5, 10, 14, 15). In our patient the thyroid cancer was detected after the diagnosis of polyposis coli and similar cases have been reported previously (5, 9, 11, 13, 16).

The cumulative incidence rate of thyroid cancer in the studied family (43 living members during the first four years of survey) was 2.32%. In the same period (January 1, 1983–December 31, 1986), the corresponding incidence rate of thyroid cancer in the general population of the Trento province (about 420000 inhabitants) was 0.014%. The relative risk of thyroid cancer among members of the GS family was thus 165. This high risk strongly supports the use of a screening program for detection of thyroid cancer in GS families and specially in patients with manifest GS. According to Thompson et al. (16) ultrasonography could be used as a screening instrument as it is simple, rapid, innocuous and cheap and has a higher resolution than thyroid radionuclide scanning (17). An extensive application of thyroid ultrasonography should also allow a better assessment of the frequency of thyroid disorders in GS and GS families.

Silvano Piffer
Department of Radiotherapy and Oncology
S. Chiara Hospital USL C-5
I-38100 Trento
Italy

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Request for reprints: Dr S. Piffer, Dept of Radiotherapy and Oncology, S. Chiara Hospital USL C-5, I-38100 Trento, Italy.

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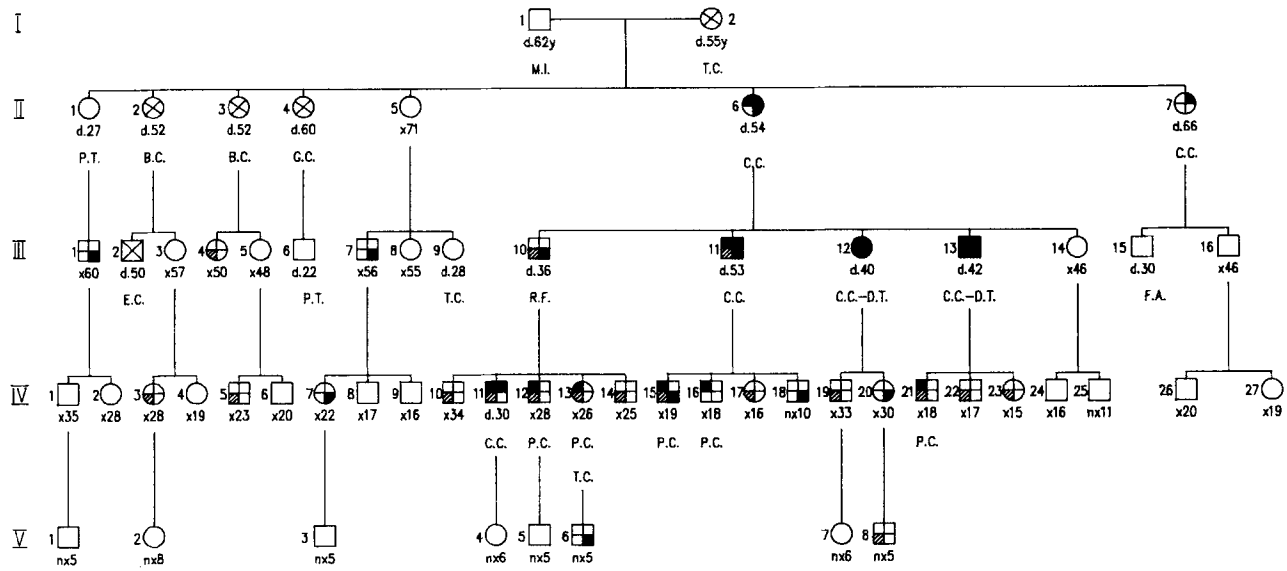

Figure. Pedigree diagram.

□○	Unaffected male and female	GC	Gastric cancer
■	Colon polyposis	TC	Thyroid cancer
⊞	Colon cancer (CC)	BC	Breast cancer
▬	Soft tissue lesions	EC	Esofageal cancer
◧	Osteomas	DT	Desmoid tumor
▨	Dental abnormalities	MI	Myocardial infarction
PC	Prophylactic colectomy	PT	Pulmonary tuberculosis
x	Roentgen examination and/or endoscopy of large intestine	RF	Retroperitoneal fibrosarcoma
nx	Large intestine not examined	FA	Fatal accident

Table

Reference	Age at diagnosis	Sex	Histology	Diagnosis in relation to time for diagnosis of polyposis coli
Lockhart-Mummery (11)	36	F	Single lobe	1 year after
Alm et al. (1)		F	Unknown	Unknown
		F	Unknown	Unknown
Camiel et al. (3)	19	F	Papillary, both lobes	9 years before
	20	F	Papillary, both lobes	9 years before
Crail (4)	24	M	Unknown	Before
Keshgegian et al. (9)	21	F	Papillary-follicular, both lobes	7 years after
Lee et al. (10)	23	F	Papillary, one lobe	9 years before
Smith (14)	39	M	Papillary-follicular, both lobes	10 years before
	Unknown		Unknown	
	Unknown		Unknown	
Smith (15)	19	F	Papillary, both lobes	7 years before
Thompson et al. (16)	24	F	Papillary-follicular, both lobes	2 years after
Schneider et al. (13)	37	F	Papillary	4 years after
Delamarre et al. (5)	27	F	Follicular	6 years before
	26	F	Papillary	5 years after
Present case	26	F	Follicular, both lobes	3 years after

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WHAT IS THE ROLE OF THE POSTSTYLOID SPACE IN THE TREATMENT OF NASOPHARYNGEAL CARCINOMA?

Sir—Radiation therapy is the treatment of choice for nasopharyngeal carcinoma (2). High doses are often required within a large volume of the head and neck, but excessive doses in the cervical spinal cord must be avoided due to the risk of complications (5). Therefore careful treatment planning is mandatory.

The poststyloid space is the most posterior part of the parapharyngeal space. It contains the internal carotid artery, the jugular vein, the sympathetic chain, the IX, X, XI and XII cranial nerves and the Krause's lymph nodes which are the most cranial internal jugular vein nodes, situated close to the jugular foramen (3, 4). Nasopharyngeal carcinoma can spread into the poststyloid space either by contiguous invasion or by lymphatic spread to Krause's nodes.

High risk of spread into the poststyloid space has to be considered and we are of the opinion that this space should always be adequately irradiated in cases of nasopharyngeal cancer. The role of the poststyloid space has also been recently underlined by other authors (1).

A dose of 45 Gy is probably sufficient for microscopic disease but the dose should preferably be increased to 60 Gy or more if macroscopic tumor is detected with CT (2). There are two main difficulties in the treatment of the poststyloid space, *i.e.* to avoid radiation myelitis and to encompass the jugular foramina into the high dose volume. In order to avoid radiation myelitis spinal cord should be excluded from the radiation fields after an absorbed dose of about 45 Gy (5).

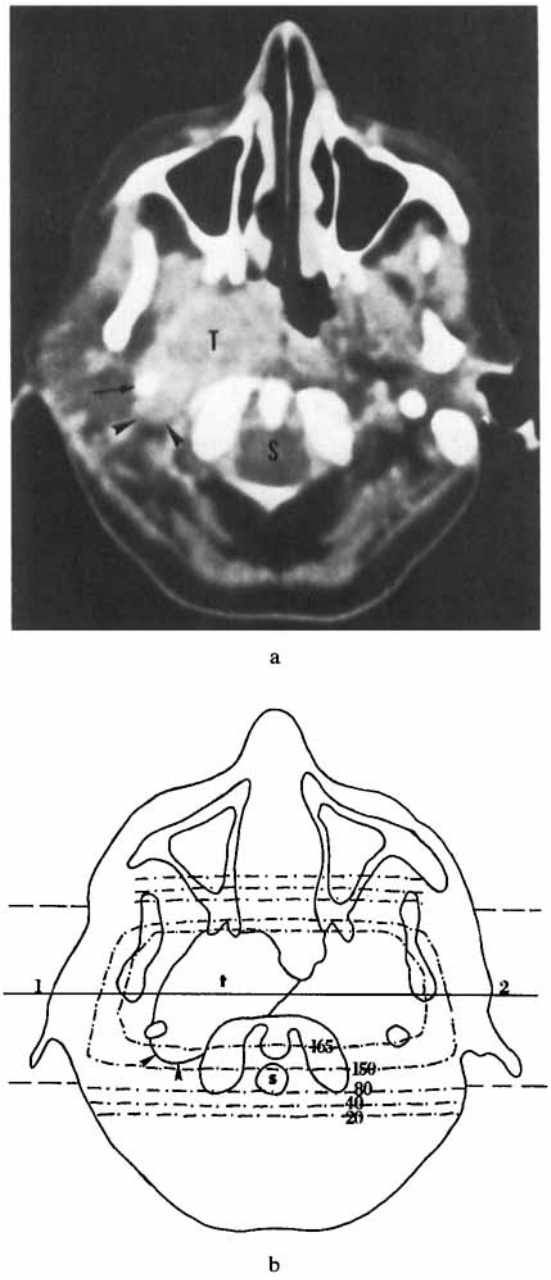

Fig. 1. a) CT scan of nasopharyngeal carcinoma (T) with macroscopic invasion of the poststyloid space (arrow heads). b) Redrawn from computer print-out. Isodose distribution from two lateral opposed 10 MV photon fields. The spinal cord (S) cannot be entirely avoided. Styloid process (arrow heads).

Due to the proximity to the poststyloid space it is very difficult if not impossible to reduce the dose in the spinal cord by an anterior shift of the lateral treatment fields, without also reducing the dose in some parts of the poststyloid space. The availability of well collimated photon beams does not eliminate this problem (Figs. 1 a, b).

In order to irradiate Krause's nodes the jugular foramina must be included into the radiation fields. Moreover the tumor can