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Case Report

Papillary Mesothelioma of the Tunica Vaginalis Propria Testis

Case Report and Ultrastructural Study

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Summary. Ultrastructural features of a papillary mesothelioma arising in a hydrocele-sack are reported. The tumour cells presented numerous microvilli, desmosomes, basement membranes and abundant bundles of microfilaments, which all are hallmarks of mesotheliomas. The predominant cell type was the "clear epithelial cell", but transitional cells and degenerative forms (foamy cells) were also found. The morphology and differential diagnosis of mesothelial tumours arising in the tunica vaginalis propria testis are discussed.

Key words: Mesothelioma – Testis – Ultrastructure – Clear cell

Apart from the adenomatoid tumour, which represents 22–32% of all paratesticular neoplasms (Mostofi and Price 1973; Pugh 1976), mesothelial tumours arising in the tunica vaginalis propria testis are very rare. Sporadic case reports (Holland 1962; Abell and Holtz 1968; Kasdon 1969; Eimoto and Inoue 1977; Nistal et al. 1978) emphasize their overall low incidence. In the series of the British Testicular Tumour Panel and Registry only 4 out of 202 paratesticular neoplasms have been accepted as true papillary mesotheliomas (Pugh 1976). Some authors (Kasdon 1969; Mostofi and Prince 1973; Pugh 1976), however, suppose that some lesions reported as "adrenocarcinoma of appendix testis", "mesonephric mesodermal carcinoma" or "malignant adenomatoid tumour" are in fact, also of mesothelial origin.

The debatable histogenetic classification of such neoplasms reflects the well known difficulties in differential diagnosis between mesothelioma and carcinoma metastatic to serous cavities (Willis 1960).

The ultrastructure of mesotheliomas, however, seems to be characteristic enough to allow a correct diagnosis (Echevarria and Arean 1968; Suzuki et al. 1976; Klima and Gyorkey 1977). Therefore the ultrastructural features of a papillary mesothelioma of the tunica vaginalis propria testis are reported here.

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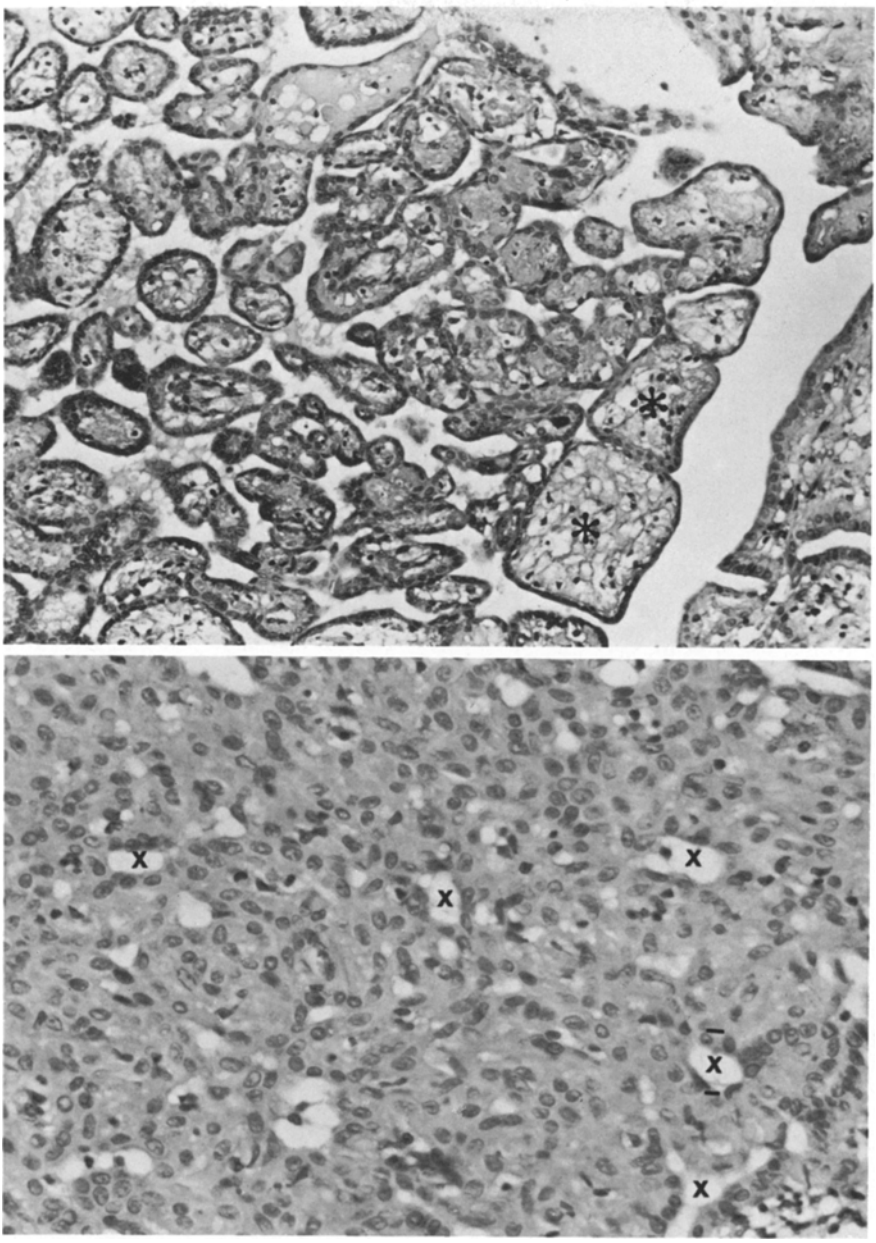

Fig. 1. Papillary mesothelioma of the tunica vaginalis propria testis. *Above:* Typical arborescent pattern with papillary processes, covered with cuboidal mesothelial cells and with "foamy cells" (*) in the stalk. HE, ×100. *Below:* A solid portion of the tumour with narrow lumina (*X*). HE, ×400

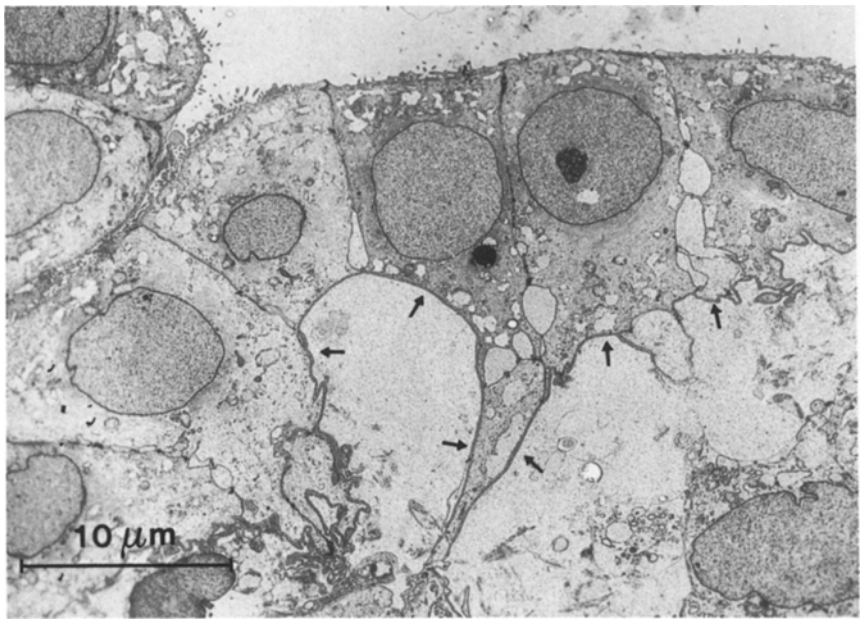

Fig. 2. Free surface of a papillary process with polar arranged mesothelial cells underlined by a continuous basement membrane (*arrow*). × 1,150

Case Report

A young male aged 18 presented himself with swelling of the left scrotum, which had started some months previous. Surgical exploration was performed under the diagnosis of "traumatic hydrocoele", because there was a history of trauma one year before. The opening of the thickened tunica vaginalis revealed 20 ccm yellow fluid and a pedunculated papillary tumour (∅ 3 cm). This tumour and a 8 × 4 cm oval portion of the tunica were excised. 17 months after surgery the patient is well and shows no clinical signs of recurrence or metastases.

Material and Methods

The specimen was submitted to the laboratory fixed in 10% buffered formalin for 48 h. Multiple blocks were embedded in paraffin and stained with haematoxylin and eosin, PAS, Alcian blue and Gomori's method for reticulum.

Pieces of formalin-fixed tumour tissue were washed overnight in phosphate buffer (pH 7.4), fixed in phosphate-buffered (0.15 M, pH 7) 6.5% glutaraldehyde. After postfixation in Dalton's chrome-osmium tetroxide, the specimens were dehydrated with acetone, embedded in Durcopan and sectioned on a Reichert "Ultracut". Thin sections were stained with uranyl acetate, lead citrate and examinated on a ZEISS EM 109.

Light Microscopic Findings

At low magnification the tumour presented a complex arborescent pattern. The small fibrous stalk branched into numerous fine papillary processes (Fig. 1 above).

The covering layers consisting of cuboidal epithelium-like cells were well demarcated from the underlying large vacuolisated cells with the appearance of signet-ring or foamy cells (Fig. 1 above). The vacuoles were PAS negative and ASTRA blue positive. In addition the tumour showed

Fig. 3. Mesothelial cells with microfilaments (*X*) in cytoplasm, short microvilli and numerous junctional structures (*arrows*). On the free surface deposits of a fuzzy material. × 3,500. *Insert:* Junctional structures between neighbouring tumour cells. × 13,000

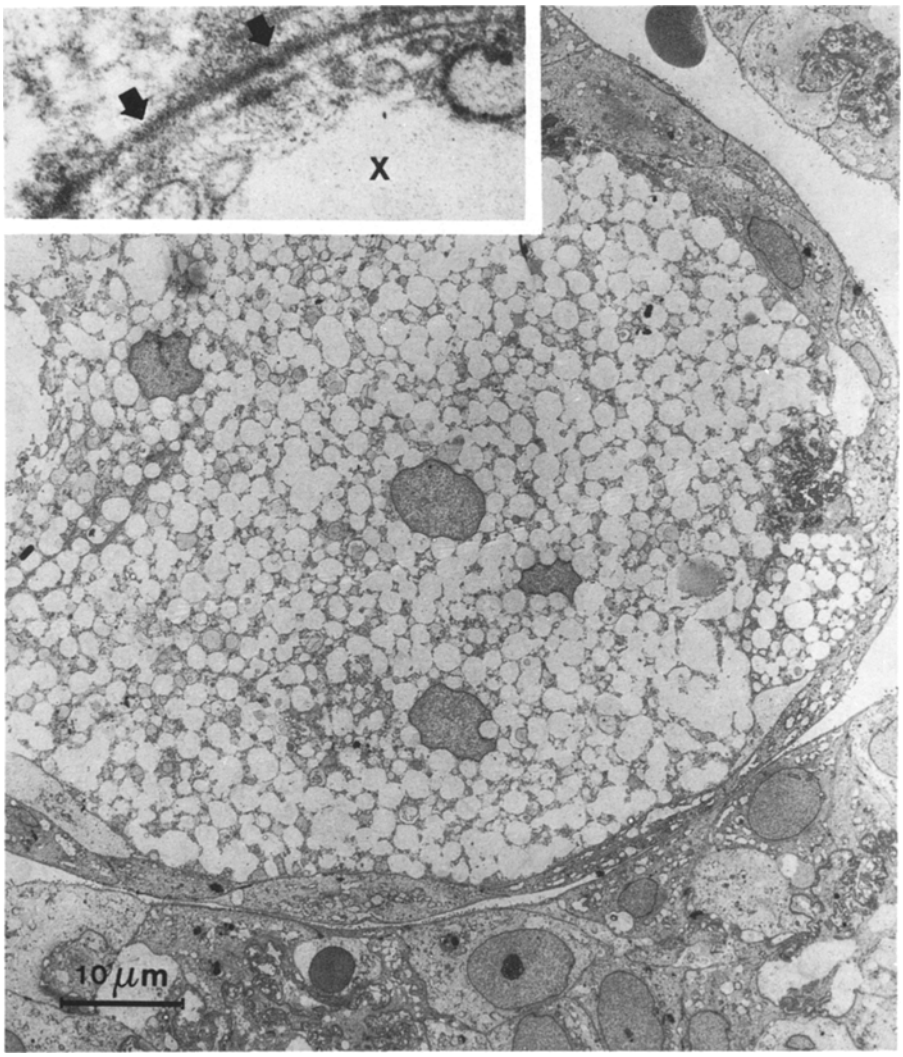

Fig. 4. A papillary process covered with flattened mesothelial cells and "foamy cells" in the stalk. × 650. *Insert:* Foamy cell with vacuoles (*X*) and remains of the basement membrane (*arrows*). × 12,000

bulky processes made up of multiple cell layers with no morphological distinction between covering and underlying cells (Fig. 1 below). Mitotic figures or cellular and nuclear atypia were not found.

Electron Microscope Findings

The papillary processes were covered with one layer of cuboidal or flattened epithelium-like cells, which showed a marked polarity (Fig. 2). A continuous, sometimes bizarely infolded basement membrane underlined these cells. The luminal face showed short microvilli (Fig. 3) and was sometimes covered with a fuzzy material. The large nuclei had some membrane indentations and prominent nucleoli. The cytoplasm contained only few mitochondria, a varying amount of rough endoplas-

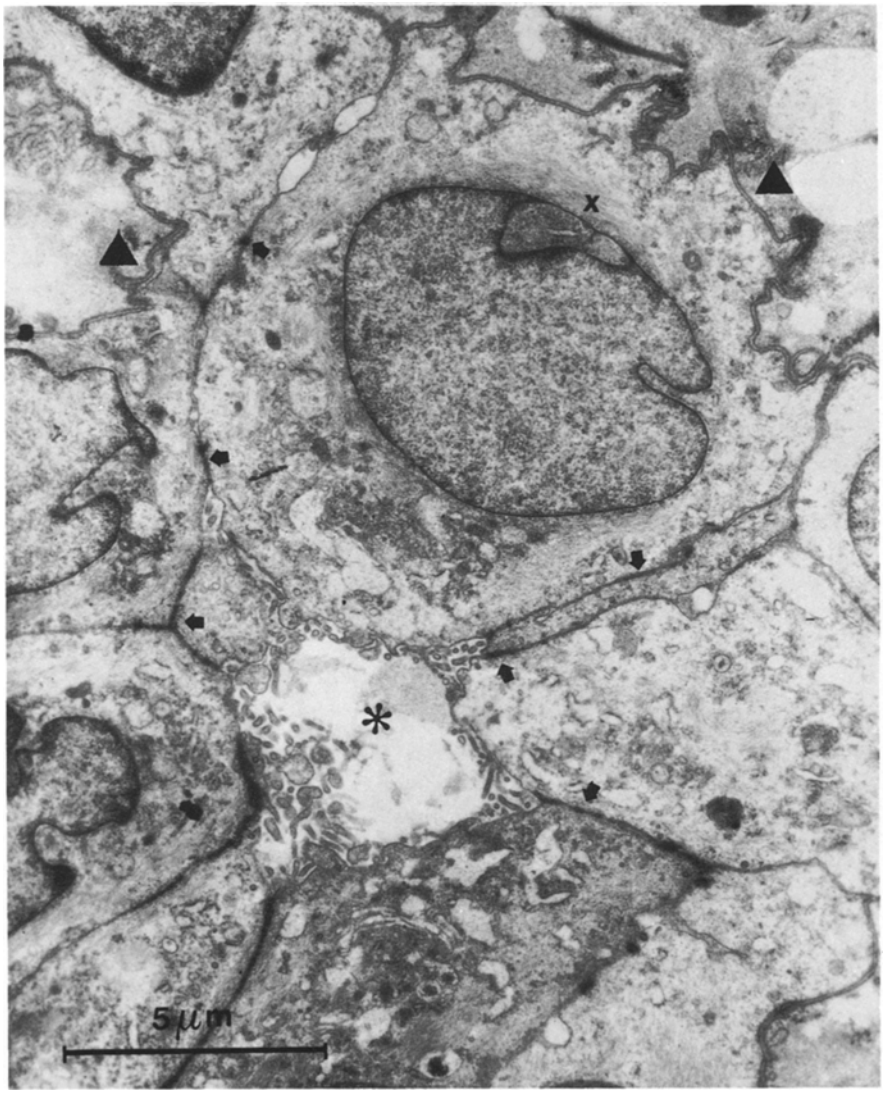

Fig. 5. A solid part of the papillary mesothelioma with a narrow lumen (*). Note the numerous junctional structures (*arrows*), microfilaments (*X*) and the basement membrane (*arrow-heads*). ×3,500

mic reticulum and numerous filaments, which were connected with desmosomes or other junctional structures (Fig. 3). The foamy cells (Fig. 4) showed large membrane-bounded vacuoles and some phagosomes. They presented only an incomplete basement membrane and few desmosomes. The nuclei were pushed to the cell border. In the portions of the tumour where the cells were arranged in solid cords and nests, they were of polygonal or oval shape. They formed small lumina, not seen in light microscopy. The number of organelles and filaments, desmosomes and microvilli (on the luminal surface) was the same as in the superficial cells (Fig. 5).

Some transitonal forms between cuboidal, polygonal and foamy cells were also present.

Discussion

The tumour of the tunica vaginalis propria testis showed epithelial cuboidal cells with microvilli, basement membranes, filaments and desmosomes, which are all hallmarks of mesotheliomas (Echevarria and Arean 1968; Stoebner et al. 1970; Kay and Silverberg 1971; Mouchel 1971; Suzuki et al. 1976; Klima and Gyorkey 1977). In our case the predominant cell type was the "clear epithelial cell", rich on filaments and with scanty organelles (Suzuki et al. 1976). In some parts of the tumour, however, "intermediate" or "transitional" cells also appeared. They represent the morphological connecting links between the epithelial and fusiform type of mesothelial cell.

The origin of the "foamy cells" is a little more enigmatic, but remnants of basement membranes and desmosomes suggest that they represent degenerated mesothelial cells like these described in pleuroperitoneal effusions (Jaugitz 1977). A more speculative conception would be that the vesciles are structural evidence of fluid exchange between tumour-cells and hydrocoele-sack. The papillary mesothelioma is a very peculiar lesion to the tunica vaginalis propria testis and can only be confused with reactive papillary mesothelial proliferations, very common in hydrocoele or/and chronic periorchitis (Mostofi and Price 1973). The very common adenomatoid tumour resembles an adenoma rather than a mesothelioma, but recent electron microscope investigations (Ferenczy et al. 1972; Taxy et al. 1974; Nistal et al. 1978) indicate a mesothelial origin. The epithelial cells of this tumour are embedded in abundant and very characteristic fibroelastic stroma, but their ultrastructure is comparable with those in our case. Nevertheless, several authors agree that the name ("adenomatoid tumour") should be kept "to distinguish the lesion from true mesothelioma" (Mostofi and Price 1973) and because it is "simple and not inaccurate" (Pugh 1976). It should also emphasize that contrary to other mesotheliomas, this lession is always benign.

Also papillary mesotheliomas of the tunica vaginalis are nearly always benign (Mostofi and Price 1973), but cases of recurrence after several years have been reported (Pugh 1976). The epithelial mesothelial cell seems to be the "stem cell" of all forms of mesothelioma (Stoebner et al. 1970; Suzuki et al. 1976). The possibility of transformation into the biphasic or pure fibro-(sarco-)matous types, which in this location are mainly malignant, therefore has to be considered. Eimoto and Inoue (1977) suggested that all fibromatous paratesticular tumours must be critically reviewed for their possible mesothelial origin. In such cases electron microscope investigation of the tumours can be very useful for a correct diagnosis.

References

Abell MR, Holtz F (1968) Testicular and paratesticular neoplasms in patients 60 years of age and older. Cancer 21:852–870

Echevarria RA, Arean VM (1968) Ultrastructural evidence of secretory differentiation in a malignant pleural mesothelioma. Cancer 22:323–332

Eimoto T, Inoue I (1977) Malignant fibrous mesothelioma of the tunica vaginalis. Cancer 39:2059–2066

Ferenczy A, Fenoglio J, Richart RM (1972) Observations on benign mesothelioma of the genital tract (adenomatoid tumour). A comparative ultrastructural study. Cancer 30:244–260
Holland JM (1962) Multiple mesothelial cysts of the parietal tunica vaginalis testis – case report. J Urol 87:903–905
Jaugitz H (1977) Vergleichende elektronenoptische Untersuchungen an Mesotheliomzellen. Arch Geschwulstforsch 47:204–209
Kasdon EJ (1969) Malignant mesothelioma of the tunica vaginalis propria testis. Report of two cases. Cancer 23:1144–1150
Kay S, Silverberg SG (1971) Ultrastructural studies of a malignant fibrous mesothelioma of the pleura. Arch Pathol 92:449–455
Klima M, Gyorkey F (1977) Benign pleural lesions and malignant mesothelioma. Virchows Arch [Pathol Anat] 376/181–193
Mouchel J (1971) Etude en microscopie électronique de deux mésothélioma pleuraux diffus. J Microsc 7:81–82
Mostofi FK, Price EB (1973) Tumors of the male genital system. AFIP, Washington DC
Nistal M, Contreras F, Paniagua R (1978) Adenomatoid tumour of the epididymis: Histochemical and ultrastructural study of 2 cases. Br J Urol 50:121–125
Osamura RY (1977) Ultrastructure of localized fibrous mesothelioma of the pleura. Cancer 39:139–142
Pugh RCB (1976) Pathology of the testis. Blackwell Scientific Publications, Oxford London Edinburgh Melbourne
Stoebner P, Miech G, Sengel A, Witz JP (1970) Notions d'ultrastructure pleurale. II. Les mésothéliomes. Presse Med 24:1403–1408
Suzuki Y, Churg J, Kannerstein M (1976) Ultrastructure of human malignant diffuse mesothelioma. Am J Pathol 85:241–262
Taxy JB, Battifora H, Oyasu R (1974) Adenomatoid tumours: a light microscopic, histochemical and ultrastructural study. Cancer 34:306–316
Willis RA (1967) Pathology of tumors. 4th eds, Butterworth London

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