RHABDOMYOSARCOMA OF THE TESTIS
REPORT OF TWO CASES

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One of the rarest varieties of intrascrotal neoplasm is a tumor composed of striated muscle. Only a few cases have been published and most of these appear as isolated reports in the older foreign literature. In many cases, the tumor was closely connected with the testicle, but it was difficult to determine whether it arose from the testis or from the adjacent tissue.

Rokitansky in 1849 described a paratesticular tumor in an eighteen-year-old boy. The growth, which was composed entirely of skeletal muscle, he interpreted as having arisen from the gubernaculum of Hunter. Senftleben in 1858 described the presence of striated muscle bundles in a well differentiated teratoma of the testis. Neumann in 1886 reported a pure rhabdomyoma in a boy three and one-half years of age. The tumor was attached to the lower pole of the testis and was composed of striated muscle fibers and large muscle cells without striations. The testis and epididymis were unchanged. Like Rokitansky, Neumann thought that the tumor arose from the gubernaculum. Kocher in 1887 collected six cases of mixed tumors of the testis containing striated muscle.

In 1890 Arnold reported a large tumor of the right testis, in a boy four years of age, largely composed of myomatous tissue with fairly distinct cross striations. In the outer portion were epithelial-lined canals. No remnant of testicular tissue could be found. Ribbert in 1892, in a general article on rhabdomyomas of the urogenital tract, reported three rhabdomyomas involving the testis. In the first patient, a boy of thirteen years, only a remnant of testicular tissue remained. In the second, a boy of fourteen years, the diagnosis was at first myxosarcoma, but later careful examination showed the presence of striated muscle. In the third case, in addition to striated muscle, there were carcinomatous and sarcomatous structures.

Picque in 1898 presented a case of testicular tumor that was examined histologically by Chevassu. Fibrous tissue, smooth muscle, blood vessels, and epithelial glandular tissue were found, as well as striated muscle. Becker in 1901 reported a bilateral tumor of the testis. The tumors contained muscle fibers, large epithelial canals, mucous plugs, and many blood vessels. Wood in 1902, in this country, described a rhabdomyoma in a boy of eighteen, completely replacing the testicle. The remains of the testicle and epididymis were still to be found near the periphery. Microscopically, this tumor contained embryonic muscle, some of which showed cross striations, cartilage, and epithelial canals.

Benenati in 1903 described a rhabdomyoma in an undescended testicle of

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a man forty-nine years of age. The tumor contained, in addition to striated muscle, spindle cells and small round cells. Schamschin in 1908 described a pure rhabdomyosarcoma of the testis in a boy of four years. He assumed that the growth originated in the vas deferens. Kaufmann in 1911 described a pure rhabdomyoma in a boy of five years, which had completely replaced the testicle. Ssinelščikowa in 1929 described a rhabdomyoma of the testis in a boy fifteen years old with mediastinal, pulmonary and abdominal metastases. The tumor contained striated muscle cells in a fibrous stroma with many foreign body giant cells and fat droplets. The metastatic areas were of similar structure.
Hirsch in 1934 reported a rhabdomyosarcoma of the spermatic cord in a boy sixteen years old. He reviewed the literature and collected 14 examples of rhabdomyoma arising from paratesticular structures. In his series, he included 11 of the above cases. Because of their close proximity to the testis,

![Image of rhabdomyoma cells with cross striations](image)

it is possible that some of these may have arisen from the testis itself. In addition, Hirsch included cases of rhabdomyoma described by Wilms, Stoerk, and Sabrazès.

Scheftel in 1936 described a case of a sarcoma of the testis in a man sixty years old. The tumor contained large embryonic cells which were interpreted as striated muscle cells although no cross striations were seen. Scheftel discussed the possibility of its origin from the capsule of the vas deferens.

This review of the literature shows that only a few rhabdomyosarcomas of the testis or paratesticular tissues have been reported. It is believed that those arising from the testis proper show evidence of a teratomatous origin by their mixed structure.

**Report of Cases**

**Case I**: A farmer, thirty-five years of age, gave a history of an injury to his scrotum in 1921 by a batted ball during a baseball game. He was incapacitated at the time for approximately three days, with moderate swelling of the scrotum that rapidly subsided. About one year afterwards he noticed a small swelling of the left testicle, but there was no growth of this tumor until about June 1935. Since that time there had been a gradual increase in size of the left testicle. The enlargement was uniform and smooth. The patient was able to perform farm work and experienced no pain. In January 1936 the swelling had increased to such size that there was difficulty in walking. On Jan. 29, 1936, the patient injured the tumor while cranking an automobile. Following this injury he had some pain and noticed a gradual increase in size of the tumor. He sought medical advice and the left testicle was removed on Feb. 2, 1936. On March 26, 1936, he received a course of deep x-ray therapy and was apparently well except for the presence of palpable inguinal lymph nodes.

The tumor on removal weighed 1,220 grams and measured $17 \times 11 \times 10 \text{ cm}$. It was firm and completely covered by the tunica albuginea. It had completely replaced the testicle and no remnant of the testis or epididymis could be found. On section a large cystic area was seen filled with necrotic material. The remaining structure was of a fleshy, sarcomatous nature. In some areas near the periphery, a jelly-like material was present. In one area, a small portion of well differentiated cartilage was seen.

Microscopically the tumor was largely made up of elongated embryonic mesenchymal cells with hyperchromatic nuclei and a relatively large amount of cytoplasm. These cells appeared to be differentiating towards striated muscle, for scattered throughout were large,
round embryonic muscle cells with a pink cytoplasm and a round vesicular nucleus (Figs. 1 and 2). Other sections showed these latter cells much better developed, having an elongated giant-cell shape. On careful study some of these large cells showed definite cross striations (Fig. 3). Mitotic figures were numerous. Sections from the necrotic material and mucoid material showed advanced necrosis with no cellular detail. The cartilaginous area revealed an adult type of cartilage. The pathologic diagnosis was highly malignant rhabdomyosarcoma of teratomatous origin.

CASE II. A boy, sixteen years of age, first noticed a slight swelling of his left testicle in March 1935. He later felt a small lump in this region that gradually enlarged, but did not tell his parents of it until April 1936, when the tumor had become so large that walking was difficult. On April 10, 1936, the tumor was removed with the spermatic cord and vessels attached. No evidence of metastasis was present. The boy is at present receiving radiation therapy.

This tumor weighed 1,560 grams on removal. It was oval in shape, well encapsulated, and very firm. The spermatic cord arose from the upper pole of the growth. The epididymis could not be found. On section a testis of normal size was discovered near the upper portion, entirely surrounded but not invaded by the tumor. The remaining structure was fleshy and solid, except in one area where some degenerative changes were present. No cartilage was found.

Microscopically, the tumor was similar to that in Case 1, except that no cartilage was demonstrable and there were many elongated muscle cells with distinct cross striations (Fig. 4). The diagnosis was a paratesticular rhabdomyosarcoma of a pure type.

DISCUSSION

Many observations have shown that a majority of testicular tumors, if studied thoroughly, will reveal derivatives of more than one germ layer. Ewing points out that one element may so greatly predominate as to obscure or even completely suppress all the other elements. Our first case is a good example of this, as numerous sections from various portions of the large tumor

2 This case was furnished to us through the courtesy of Dr. Kano Ikeda of St. Paul, Minnesota.
were essentially myomatous in structure, and it is only the relatively small portion of cartilage present that confirms the teratomatous origin. This is also strong evidence that this tumor arose from the testis proper, and not from any adjacent paratesticular structure.

In the second case, we have a rhabdomyosarcoma arising from the adjacent structures with the testis uninvolved and no mixed structure demonstrable. The exact origin of this tumor is impossible to determine. Kaufmann considers the cremaster muscle, gubernaculum of Hunter, muscular coat of the epididymis, or an embryonic rest as possible sources of origin. However, it is significant that in those cases where the testis has been uninvolved, apparently pure neoplasms have existed. Hence in those cases in which the growth is situated so close to the testicle that it is impossible to determine whether it is of a true testicular origin, one should search carefully to determine whether any mixed structures are present that would indicate a testicular teratomatous origin.

The ages of our two patients were thirty-five and sixteen years. The occurrence of rhabdomyosarcomas of the testicle in young individuals is apparent from the ages in the reported cases.

A prolonged study of sections stained with iron-hematoxylin is often necessary before cross-striated muscle cells are found. However, the presence of numerous giant-like cells with eosinophilic cytoplasm is almost sufficient to establish the diagnosis.

**Summary**

Two intrascrotal rhabdomyosarcomas are reported, one of which is believed to have originated from the testis and the other from the paratesticular tissue.

**BIBLIOGRAPHY**

8. Kocher: Quoted by Ewing.