

Brief Note

Intramyofiber Metastasis of Ovarian Carcinoma

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**Key words : intramyofiber metastasis — carcinoma —
ovary — muscle**

Skeletal muscle is frequently invaded by tumors.¹⁾ The pectoral muscles, for instance, are infiltrated by breast carcinomas, and the muscles of the pelvic floor by rectal and uterine cancers. Massive skeletal muscle involvement may occasionally develop.²⁾ Generally, neoplasms invade the muscle tissue directly through interstitial tissue or through lymphatics between the muscle fibers. Although it is quite rare, there is another mode of neoplastic extension in the muscle which is usually associated with interstitial infiltration. Cancer cells may penetrate the sarcolemmal sheaths and multiply within the muscle fibers. The sarcolemma of the invaded muscle fibers often remains as a distended investing sheath for a cancer nest. This mode of metastasis is often referred to as "intramyofiber metastases in skeletal muscle."

Recently, we encountered such an example. Postmortem examination in a case of ovarian serous cystadenocarcinoma with massive and generalized metastasis revealed psoas muscle invasion with nests of tumor cells within individual myofibers (Figs. 1 & 2). In the past, one of the authors (T.M.) experienced similar changes in the psoas muscle with a metastatic ureteral transitional cell carcinoma, in the intercostal muscle with a metastatic small cell carcinoma of the lung, and in the neck muscle with an invasive adenoid cystic carcinoma of the submandibular gland (unpublished observation).

Review of the literature disclosed a few documentations. In 1942, Harts and Van der Sar³⁾ illustrated intramyofiber metastases of leukemic cells in the pectoral and intercostal muscles in a patient with myelogenous leukemia. Hassin⁴⁾ reported a case of squamous cell carcinoma of the upper third of the esophagus in which intramyofiber metastases were present in the intrinsic laryngeal muscles. In his textbook, Willis¹⁾ described such a mode of metastasis in lung carcinoma. Slatkin and Pearson⁵⁾ reported a case of intramyofiber metastases of the psoas muscle from a small cell anaplastic carcinoma of the lung, and recently Lasser and Zacks⁶⁾ noted such a mode of metastases in a case of recurrent adenocarcinoma of the breast. According to Hassin,⁴⁾ there are two early German articles on this subject; one by Volkmann in 1870 and the other by Well in 1873. Volkmann seems to have been the first to suggest that cancer cells may enter through a traumatized area in the sarcolemma. Intramyofiber infiltration and proliferation of tumor cells was studied in experimental models by Galask and Muckle⁷⁾ in 1974 and by Carr *et al.*⁸⁾ in 1975. Despite their extensive ultrastructural studies, however, they failed to observe actual tumor cell invasion. Carr *et al.* demonstrated that carcinoma cells penetrating the sarcolemma were often accompanied by polymorphonuclear leukocytes and macrophages that

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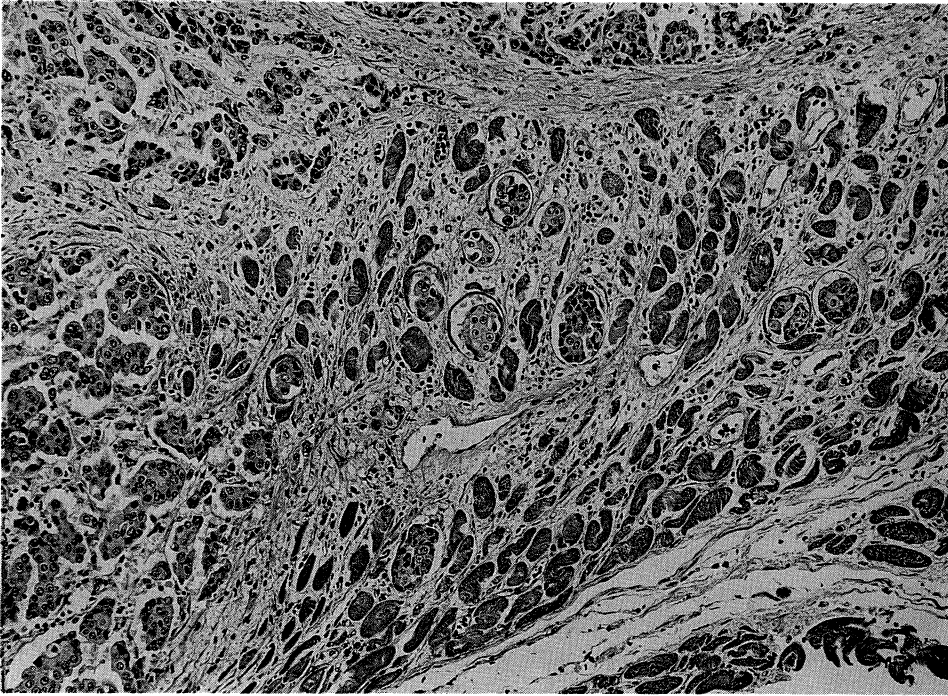


Fig. 1. Intramyofiber metastasis of ovarian carcinoma

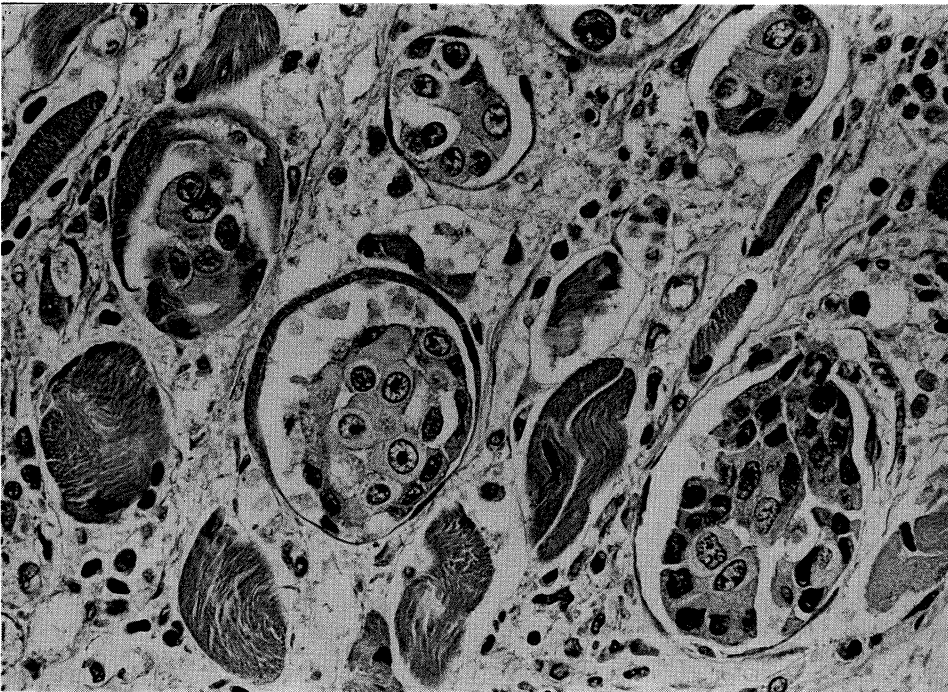


Fig. 2. Intramyofiber metastasis of ovarian carcinoma (Higher magnification of Fig. 1)

contained disintegrated myofibrillar debris. Based on these findings, they suggested the possibility that host cells may degenerate due to anoxia, allowing migration of the tumor cells, which are more resistant to anoxia. This, however, does not explain the infrequency of intramyofiber metastasis in disseminated cancer cases with muscle involvement, and the precise mechanism of access used by the tumor cells to invade the muscle fibers still remains unknown.

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