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# Sudden Death from Massive Tumor Embolization of Chondrosarcoma

## REPORT OF A CASE

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The natural history of chondrosarcoma usually is characterized by a slowly progressive course leading to death from recurrences or metastases<sup>9</sup>. In some cases, however, this course is altered dramatically by intravascular invasion of tumor, long recognized as a feature of chondrosarcoma<sup>6,11</sup>. Chronic, extensive intravascular growth can produce a puzzling clinical picture; if undetected, such invasion can lead to sudden death by embolization, as in the case presented here.

### Case Report

J. C., a nineteen-year-old black man, entered Georgetown University Hospital because of pain in the right hip and a 4.5-kilogram weight loss during the previous five months. His past medical history was negative.

On physical examination, he had a large, firm mass in the right side of the pelvis and weakness of the quadriceps muscles of the right thigh. Laboratory values were within normal limits. Roentgenographic examination revealed a large, calcified mass involving the right sacro-iliac joint (Fig. 1). Intravenous urogram and barium-enema studies indicated that the mass displaced the right ureter and ascending colon medially (Figs. 2-A and 2-B). Electromyography of the right lower extremity suggested compression of the lumbosacral plexus. A technetium 99 bone scan showed no uptake in the mass and did not demonstrate metastases. Arteriograms revealed neither arterial invasion nor neovascularization (Fig. 2-C). A hemipelvectomy was planned.

At surgery, because the 800-gram sarcoma extended beyond the planned hemipelvectomy margins, the tumor mass was excised locally. The procedure went smoothly until closure, when the blood pressure fell precipitously to 40/0 millimeters of mercury and the patient had a cardiac arrest. Resuscitative measures were unsuccessful.

At necropsy, the operative site exhibited minimum extravasated blood but there were small fragments of residual tumor adherent to the right side of the pelvis. The right common iliac vein and its major tributaries were filled with firm, nodular tumor, loosely adherent to the vessel walls. The lumina of the more distal radicles, the middle rectal and the pudendal veins, were totally occluded by tumor. No one original site of vascular invasion could be ascertained, so a presumption was made that invasion was multifocal. Proximally, the inferior vena cava was free of sarcoma except for a loose, 4.5-centimeter-long tumor embolus extending into one hepatic vein. A 110-gram, twenty-centimeter-long tumor embolus lay coiled in the right atrium and right ventricle, totally obstructing the tricuspid valve. Histologically, both the tumor mass and the emboli were well differentiated chondrosarcoma.

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### Discussion

This case of chondrosarcoma was marked by extensive intravenous growth of tumor following penetration of the pelvic or retroperitoneal veins, apparently along lines of least resistance, and subsequent massive tumor embolization. The latter event probably occurred during surgical manipulation of the main tumor mass and its extensions.

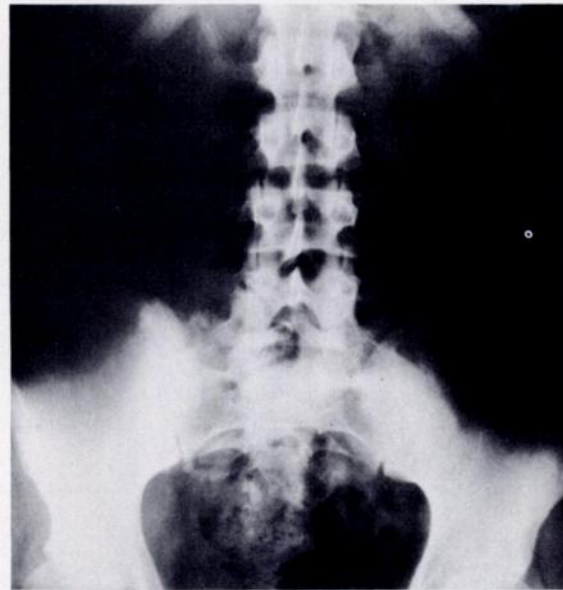


FIG. 1

A plain roentgenogram of the abdomen demonstrates a large mass in the right pelvis with heavy, blotchy calcification. The right sacral ala is involved.

No report of a major series of chondrosarcomas discussed this rare complication<sup>1,5,6,9</sup>. It is noteworthy that in most cases of major intravascular growth of chondrosarcomas (including the one reported here), the individuals were considerably younger (thirteen to twenty-two years old) than the age of maximum incidence of chondrosarcoma, the fifth or sixth decade<sup>1,2,4,7,8,11</sup>.

In the present case, the chondrosarcoma was well differentiated and the intravascular portions in large veins were endothelialized with a space between the tumor and the vein wall (Fig. 3). Apparently, progress was slow

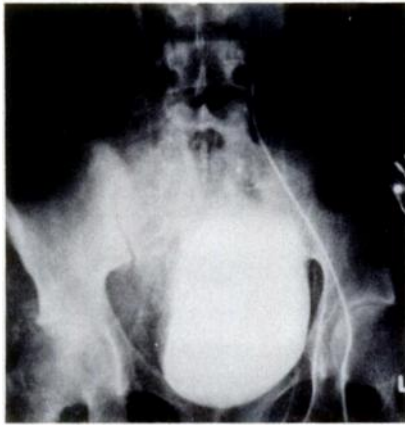


FIG. 2-A



FIG. 2-B



FIG. 2-C

Figs. 2-A and 2-B: An intravenous urogram and barium-enema study show medial displacement without invasion of the right ureter and ascending colon by a retroperitoneal mass.

Fig. 2-C: An arteriogram shows no tumor blush or neovascularization.

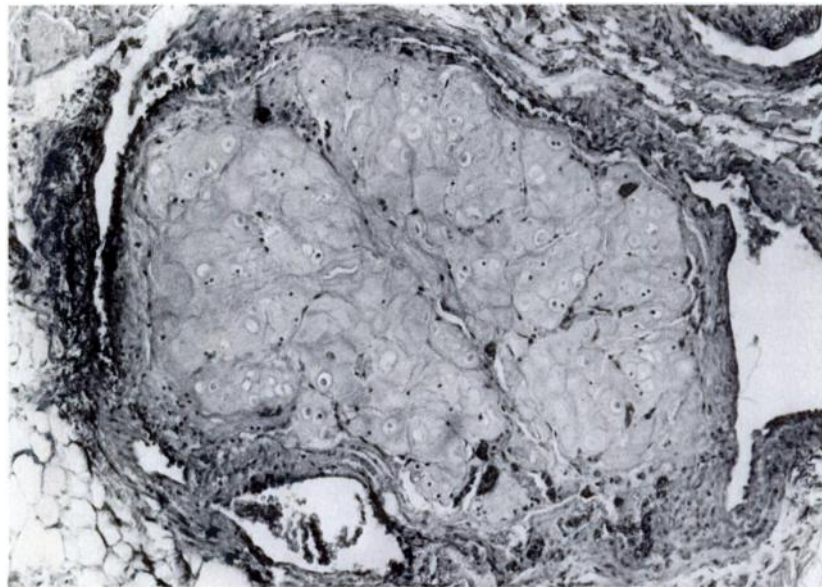


FIG. 3

The tumor in the pelvic veins is well differentiated and reveals an endothelial cover and internal blood vessels (hematoxylin and eosin,  $\times 100$ ).

enough to permit cardiovascular adaptation to the nearly total occlusion of the inferior vena cava<sup>2,10</sup>. Ultimately, all but one of the patients with extensive intravascular growth of their sarcomas died either because the tumor extended to the heart and lungs, or, as in our patient, because of massive tumor embolism<sup>3</sup>. To our knowledge, in no reported case has this disastrous event occurred during surgery.

The sudden death of a teen-aged patient due to mas-

sive emboli from unsuspected intravascular chondrosarcoma reinforces the value of extensive periodic diagnostic evaluation in each case. The relatively slow course with late metastases of chondrosarcoma permits complete work-up of the patient. Whenever chondrosarcoma of the pelvis, spine, or extremities is suspected in a young person, the possibility of extensive venous extension should be considered and the appropriate diagnostic tests performed.

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