Retroperitoneal Sarcomas

Grade and Survival

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Background: The survival of patients with retroperitoneal sarcomas depends on the feasibility of complete resection and the grade of the tumor.

Hypothesis: A high rate of complete resection, wide rather than local excision when feasible, and a policy of prompt reoperation for local recurrence all improve survival.


Results: The complete resectability rate was 95%, being 99% (78/79) for the primary tumors and 90% (46/51) for tumors referred with local recurrence. Local recurrence after complete resection occurred in 41% (32/79) of those with primary tumors and in 61% (31/51) of those referred with local recurrence (P = .06). The local recurrence rate was 63% after local excision and 39% after wide resection (P = .02). Of 83 patients with relapse, 37 (45%) were rendered surgically disease free. The estimated 5-year (10-year in parentheses) survival from the first surgery at our center was 65% (56%) for patients with primary tumors and 53% (34%) for patients referred with local recurrence (P = .23). For the primary tumors, the 5- and 10-year survival rates were 70% and 60%, respectively, after wide resection and 47% and 39%, respectively, after local excision (P = .04). For the primary tumors, the 5-year survival was 92%, 54%, and 48% for grades I, II, and III, respectively (P = .02). For those referred with local recurrence, the figures were 76%, 45%, and 19% for grades I, II, and III, respectively (P < .001).

Conclusions: A high resectability rate (95%) is possible in retroperitoneal sarcomas. The survival estimates are similar to those following resection of extremity soft tissue sarcomas given an effective reoperation policy for local recurrences. Wide resection lowers the local recurrence and improves survival significantly. Survival varies significantly according to the grade of the tumor.

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Retroperitoneal sarcomas are well known to present difficulties in their complete resection because of their inaccessible location and the absence of early symptoms, resulting in tumors of large size by the time the diagnosis is made. A collective review article that analyzed the reports of retroperitoneal soft tissue sarcomas from major centers found that complete resection was possible in 294 (53%) of 560 patients treated in major centers, with a 5-year survival rate of only 34%, largely because in nearly half of the patients the tumor was not resected. In this article, we present our experience with the management of retroperitoneal soft tissue sarcomas.

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METHODS

PATIENTS

The charts of 130 consecutive patients with retroperitoneal soft tissue sarcomas treated from July 1, 1977, through September 30, 2001, were reviewed. All patients were operated on by one of us (C.P.K.), the first 90 at the Roswell Park Cancer Institute, Buffalo, NY, and the subsequent 40 patients at Kaleida Health–Millard Fillmore Hospital, Buffalo. The mean follow-up from the first surgery at our center was 55 months (median, 41 months; range, 3-215 months). There were 61 women and 69 men. The mean age was 56 years and the median age, 57 years, with a range of 13 to 88 years. These were all of the patients with nonmetastatic primary or locally recurrent retroperitoneal sarcoma seen during the study period, and all underwent exploratory laparotomy. No visceral sarcomas were included in this review.

Seventy-nine patients were referred with a primary tumor and 51 with local recurrence. The histologic type of the various tumors is shown in Table 1. The grades of the tumors are shown in Table 2. Complete resection was the removal of all the visible and palpable tumor as one piece, so that at the end of the procedure there was no tissue in the operative field that, on inspection or palpation, could be considered suggestive of residual disease. A complete resection was a local excision having a minimal amount of normal tissue (1-9 mm) around the tumor mass, or wide excision with a minimum margin of normal tissue of 1 cm or greater around the tumor, or hemipelvectomy in a few patients with pelvic wall sarcomas. The minimum margin of normal tissue...
around the tumor mass identified by the pathologist determined the classification of the procedure as local or wide resection. Local excision was used in 41 patients (32%), wide excision in 77 (59%), and hemipelvectomy in 6 cases (3%) with pelvic sarcomas involving the pelvic wall on one side. Partial excision was used in 6 patients (5%), 3 with locally recurrent tumors. Complete resection was possible in 78 (99%) of the 79 patients referred with primary sarcoma and in 46 (90%) of the 51 patients referred with locally recurrent sarcoma.

Estimated survival distributions were calculated by the Kaplan-Meier method. Tests of significance with respect to survival distributions were based on the log-rank test. Survival was calculated from the first operation at our center. All patients, including those with partial excision of their tumor, were considered in survival estimations.

SURGICAL TECHNIQUE

For retroperitoneal sarcomas of the upper quadrants of the abdomen, a thoracoabdominal incision joining the middle of an upper midline abdominal incision was often used, with the patient in a lateral position. En bloc resection of the tumor was performed with any adjacent involved structures such as diaphragm, kidney, and colon, including, as needed, on the left side the spleen, the tail of the pancreas, and a portion of the stomach, and on the right side, a portion of the right lobe of the liver.

For retroperitoneal sarcomas of the flank, the patient was also placed in a lateral position and a flank transperitoneal approach was used combined in a “T” extension with a midline incision. The tumor was mobilized first off all other attachments (posterolateral and anterior), and then medial attachments to the aorta or inferior vena cava were dealt with. Retroperitoneal sarcomas of the midabdomen and midpelvis were approached through a midline incision with the patient in a supine position. Exposure of the superior mesenteric vessels was carried out for tumors at the base of the mesentery to determine resectability and provide the widest and safest margin around the tumor. For midline pelvic sarcomas, a lower midline incision was extended to the pubic symphysis and thence transversely to the pubic tubercle on each side, transecting the rectus abdominis and the rectus sheath off the pubic crest.

For sarcomas of the lower abdominal quadrants with fixation to the iliac fossa, the wall of the lesser pelvis, or the external iliac vessels, the abdominoinguinal incision was used to provide exposure with the patient in a supine position. Rarely, hemipelvectomy was required for pelvic sarcomas with extensive invasion to one side wall of the pelvis.

RESULTS

There were no postoperative deaths. Of the 130 patients referred with localized retroperitoneal sarcoma, the tumor was resected in 124 (95%). The tumor diameter was less than 5 cm in 3 patients, 5 cm in 3 patients, and more than 5 cm in 124 patients (95%).

At a median follow-up of 41 months, the rate of local recurrence was 41% (32/79) for patients with primary retroperitoneal sarcoma and 61% (31/51) for patients referred with local recurrence (P = .06). However, local recurrence continued to occur over the years, so that of the 79 patients with primary tumors, 43% at 5 years and 34% at 10 years survived free of local recurrence (Figure 1). The local recurrence rate after local excision was 63% (26/41), and after wide excision, 39% (30/77) (P = .02). The local recurrence rate for patients treated with surgery alone (n = 98) was 53% and for those with resection and postoperative radiation (n = 32) it was 38% (P = .16). Considering all patients, the rate of local recurrence for grade I, II, and III tumors, respectively was 48%, 56%, and 46%. The estimated 5- and 10-year survival was 54% and 39%, respectively, for patients manifesting 1 or more local recurrences (n = 61) after the initial surgery at our center, while the respective estimates for patients without local recurrence (n = 63) were 66% and 58%, respectively (P = .05). Distant recurrence was observed overall in 48 (37%) of the 130 patients, in 34% of those with primary retroperitoneal sarcoma, and in 41% of those referred with local recurrence. For grade III sarcomas, the 5-year survival for patients with adjuvant chemotherapy with the ADIC protocol (doxorubicin hydrochloride plus dacarbazine) (n = 15) was 20%, and for those without adjuvant chemotherapy (n = 34), it was 49%.

Of the patients who underwent resection (n = 124), 36 remained alive without recurrence, 5 died without evidence of disease in the follow-up period of other causes, and the remaining 83 patients presented with a recurrence and/or died of the disease. At a median follow-up of 41 months, 73 patients (59%) were alive and disease free, ie, 37 (45%) of 83 were restored to a disease-free status through 1 or more operations for their recurrence(s).

The overall estimated 5-year survival from the first operation at our center was 60%, being 65% for patients with primary retroperitoneal sarcomas and 53% for those referred with local recurrence. The 10-year survival for all patients was 48%, being 56% for primary retroperitoneal sarcomas and 34% for those initially referred with local recurrence (P = .23) (Figure 2).

For the primary retroperitoneal sarcomas, the 5- and 10-year survival estimates were, respectively, 47% and 39% after local resection (n = 19), 70% and 60% after wide excision (n = 54), and 50% and 50% after hemipelvectomy (n = 4). The difference in survival between patients treated with local excision and wide resection was significant (P = .04). On multivariate analysis covering all patients, significant prognostic factors for survival were the grade (P = .001), followed by procedure (wide vs local excision; P = .01), whereas the tumor size as a continuous variable was not significant (P = .49). The improved survival after wide resection over that of local resection could not be explained on any bias resulting from a favorable grade distribution (Table 3).

Five-year survival varied significantly with the grade of the tumor, being for the entire series 84% for those with grade I tumors (n = 55), 50% for those with grade II

| Table 1. Histologic Types of Retroperitoneal Sarcomas |
|----------------|----------------|
| Type            | No. (%) of Patients |
| Liposarcoma     | 53 (41) |
| Leiomyosarcoma  | 21 (16) |
| Unclassified    | 19 (15) |
| Malignant fibrous histiocytoma | 13 (10) |
| Neurogenic sarcoma | 10 (8) |
| Fibrosarcoma    | 5 (4) |
| Rhabdomyosarcoma| 2 (2) |
| Synovial sarcoma | 2 (2) |
| Hemangiopericytoma | 3 (2) |
| Spindle cell sarcoma | 2 (2) |

*Because of rounding, percentages do not total 100.
tumors (n = 26), and 39% for those with grade III tumors (n = 49) (P < .001). The survival rates according to grade also varied significantly within the subgroups of primary and locally recurrent tumors (Table 2) (Figure 3 and Figure 4).

**COMMENT**

Retroperitoneal sarcomas usually attain a large size before they cause any symptoms for the patients, and they are often detected because of a palpable mass without any attendant symptoms. In our series, only 3 patients had a tumor mass less than 5 cm in diameter. The rate of complete resection has varied in the literature from 38% to 74%, other reports falling in between, while the average complete resectability rate in a collective review was 53%. The resectability rate in the literature is low because in most centers patients with retroperitoneal sarcomas are operated on in a supine position through a midline abdominal incision that does not take advantage of gravity for patients with upper-quadrant or flank tumors. Often the wrong strategy is followed, ie, insistence on first separating the tumor mass from the major retroperitoneal vessels, eg, aorta and inferior vena cava, as an early determinant of resectability, which is a superficially logical policy but often induces the surgeon to abandon the procedure, as it carries a perceivable (and actual) risk of uncontrollable hemorrhage. The correct strategy for a mass abutting the great retroperitoneal vessels is to mobilize it all the way around, from its anterior, lateral, and posterior attachments, and then as the last step to separate it from the aorta or inferior vena cava, as the case may be. In our experience, the overall resectability rate for primary and locally recurrent retroperitoneal sarcomas has been 95%. Overall, the 5-year survival (10-year in parentheses) in our series was 65% (56%) for primary retroperitoneal sarcomas and 53% (34%) for those referred with local recur-
ence. These estimates approach those of extremity soft tissue sarcomas. The major problem of retroperitoneal sarcomas is that of local recurrence after an apparent complete resection because of the difficulties in procuring wide margins all the way around the tumor. The rate of local recurrence in our series was 42% for the primary tumors and 51% for those referred with local recurrence. However, the rate of local recurrence continues to increase with the years of follow-up (Figure 1). There was a trend (P = .16) toward reduction of the local recurrence with postoperative radiation. Patients without local recurrence for the duration of follow-up had better survival (P = .05). Wide resection reduced the rate of local recurrence (39%) compared with that after local excision (63%) (P = .02). In the group of primary tumors, wide resection resulted in 5- and 10-year survival estimates of 70% and 60%, whereas the respective figures after local excision were 47% and 39% (P = .04). On multivariate analysis, the procedure (wide vs local excision) was a significant prognostic indicator (P = .01). The difference in survival between wide and local excision could not be explained on the basis of any appreciable difference in the rate of the various grades encountered in each surgical group (Table 3). It is generally accepted that wide resection results in a lower rate of local recurrence compared with local excision; however, the fact that it also leads to a significantly higher survival in retroperitoneal sarcomas has not been previously reported, to our knowledge, and, therefore, this point needs to be further examined in future (preferably prospective) studies.

In a report from a major cancer center, complete resection was achieved in 65% of patients with primary retroperitoneal sarcomas, followed by a local recurrence rate of 49%, with complete resection of the locally recurrent disease achieved in 44%. In a collective review, the local recurrence rates during long-term follow-up exceeded 90%.

In other reports, complete resection was possible in 59%, 75% (5- and 10-year survival of 31% and 19%, respectively), 65%, and 78%. Survival has been enhanced by multiple resections. The probability of local recurrence was 85% by 5 years in one report. Recurrences continue to occur for long periods, since, of the patients disease free at 5 years, 40% had recurrences by 10 years in one study. In the last report from Memorial Sloan-Kettering Cancer Center, the actual 5-year survival of patients with complete or partial resection was 36%.

After complete resection of the tumor, the most important biological factor to determine survival has been the grade of the retroperitoneal sarcoma. In our series, the complete resectability rate has remained stable (at 95%) over the years. The 5-year survival for grade I, II, and III tumors in our series was 84%, 50%, and 39%, respectively (P < .001) (Table 2), confirming the prognostic importance of grade. On multivariate analysis, significant factors on survival were the grade (P = .001), followed by the procedure (wide vs local excision; P = .01), whereas the tumor size was not significant (P = .49). At a median follow-up of 41 months, 73 (59%) of the patients who underwent resection (n = 124) were alive and disease free, of whom 36 remained alive without recurrence for the entire follow-up and 37 (of 83 with recurrence) were restored to a disease-free status through 1 or more operations for their recurrence(s). It is therefore clear that in addition to a high initial resectability rate, a strat-egy of prompt reoperation for local recurrence is an important component of treatment for a high survival rate in patients with retroperitoneal sarcomas.

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REFERENCES