

Complications and outcome after surgical treatment of pelvic sarcomas

– Does competing risk add to treatment considerations?

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Background:

Treatment of pelvic tumors remains challenging due to complex anatomy, poor oncological outcome and high complication rates following these procedures. As additional reconstruction techniques have been shown to further raise the number of complications more minimal invasive reconstruction procedures have been attempted. A competing risk (CR) approach for estimating the risk of complications may results in a more realistic description, taking into account the competing event of death, and possibly alters decision making in these patients with poor oncological outcome.

Questions:

We sought to answer the following questions with this study: (1) What was the oncological outcome of patients after resection of a pelvic sarcoma? (2) What was the surgical outcome and, especially, what type of complications occurred in patients following these procedures? (3) What were the estimated risks of complications when using a Kaplan-Meier (KM) and a CR model?

Patients and Methods:

These included 156 patients with a pelvic sarcoma with an average age of 39 years at time of surgery. The median follow-up was 83 months (range 1-283 months). Resection without reconstruction was performed in 50 patients (32%); endoprosthetic reconstruction in 47 (30%); biological reconstruction in 23 (15%); hip transposition in 14 (9%); external hemipelvectomy in 19 (12%); and hemicorporectomy in one (<1%). Statistical analysis was performed using a Kaplan-Meier survival estimation and by applying the Fine-Gray regression for CR endpoints.

Results:

The estimated overall survival (OS) probability to death was 78% at one year, 45% at five years and 36% at ten years, respectively. OS to death was higher for patients with negative surgical margins ($p=0.006$). Forty-six patients (29%) had at least one or more major complications. KM analysis showed a incidence for of 25%, 38% and 42% at 1, 5, and 10 years while CR analysis showed a cumulative incidence for major complication of 23%, 31% and 33% at 1, 5, and 10 years, respectively. Patients who underwent reconstruction had a higher risk of experiencing a major complication in KM ($p<0.0001$) and CR ($p<0.0001$) analysis. KM analysis revealed a incidence of 38%, 58% and 62% while CR analysis showed a cumulative incidence of 36%, 48% and 50% at 1, 5, and 10 years for patients with reconstruction to experience a major complication, respectively. KM analysis showed a incidence for of 14%, 21% and 28% while CR analysis showed a cumulative incidence for major complication of 13%, 17% and 21% at 1, 5, and 10 years for all patients to experience infection, respectively. Again, patients who underwent reconstruction had a higher risk of experiencing an infection in KM ($p=0.004$) and CR ($p=0.003$) analysis. Correspondingly, KM analysis revealed a incidence of 21%, 35% and 39% while CR analysis showed a cumulative incidence of 20%, 29% and 31% at 1, 5, and 10 years for patients with reconstruction to experience an infection, respectively.

Discussion:

Despite including death as a strong competing event in the statistical evaluation, pelvic resections are still associated with a high incidence of complications, especially after pelvic reconstruction. These lower failure probabilities with CR analysis may better reflect reality considering the high competing risk of death of disease in these oncologic patients with unfavorable tumors. Consequently, a cautious and restrictive decision-making process is necessary when indicating pelvic reconstruction.

