Challenging the Conventional Surgical Corridors in Pelvic Tumors: Is there a Need to Revisit Conventional Pelvic Resections?

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INTRODUCTION:

Conventional periacetabular pelvic resections are associated with poor functional outcomes. Resections through surgical corridors beyond the conventional margins may be helpful in retaining greater function without compromising the oncological margins. The aim of the present study was to compare the functional and oncological outcomes of conventional resections with resections using modified resection levels to salvage as much acetabulum as is oncologically safe. We describe what can be called as Type I + half and Type III + half trans□acetabular pelvic resections, in comparison to complete acetabular resection with conventional Type I + II and Type II + III pelvic resections of Enneking. Our research questions were:

• If preservation of acetabulum improves functional outcome?
• How do transacetabular pelvic resections compare with those in acetabulum was sacrificed?

METHODS: The study included a retrospective review of 82 cases of pelvic resections for pelvic tumors. Functional outcome was assessed using MSTS93 scoring system and the Harris Hip Score. Oncological outcomes with respect to local recurrences and distant metastases, as well as nononcological complications were recorded. The incidence of resurgery to address these complications was also noted. For analysis of our results, we divided the patients into two groups for comparison of outcomes. Group A included patients who underwent periacetabular pelvic resections with preservation of partial or complete acetabulum. These included Type 1, Type I + half, Type III, and Type III + half resections. Group B included patients with complete acetabular resection. These included Type I + II, Type II + III, Type I + II + III, and Type I + II + III + proximal femur resections. Also, we compared functional and oncological outcomes of Type I + half resections (Group 1) with Type I + II resections (Group 2), and Type III + half resections (Group 3) with Type II + III resections (Group 4).

RESULTS: A total of 82 cases of pelvic resections for pelvic tumors were identified. There were 54 males and 28 females in the study. The average age of affection was 30.3 years (range 5–66 years). The average follow□up period was 53.3 months. Chondrosarcoma was the most common tumor seen in 50% patients, followed by Ewing's sarcoma in 23.2% and Osteosarcoma in 17.1% of cases. Tumor□free surgical margins with no residual disease (R0 margin) were attained in 67 (81.7%) patients, while microscopic residual disease (R1 margin) was found in 15 (18.3%) of the patients. Mean MSTS93 score and mean HHS at the latest follow up was 21.25 ± 2.19 (range 14–25) and 87.16 ± 8.27 (range 62.9–96.5) respectively, depicting a good functional outcome. Mean shortening of 2.69 ± 1.65 cm (range 0.5–8.5) was noted on the affected side. Wound healing problems and wound dehiscence were noted in 17 (22.4%) patients which resolved with local dressings and wound care. Ten (13.2%) patients developed deep infection which required aggressive debridement and antibiotics. Six patients had residual sciatic nerve palsy at the latest follow up. Local recurrence occurred in 14 (18.4%) patients at a mean postoperative period of 15.6 months. Twenty□one (27.6%) patients developed distant metastasis. A total of 14 resurgical procedures were performed for addressing the local complications including local recurrence excision and debridement for deep infections. At last
follow□up, 21 (25.6%) patients had died due to disease and one patient was alive with disease, while the rest of the patients (73.1%) were free of disease. On comparison of Group A (n = 44) with Group B (n = 38), both the groups were similar with respect to age, gender, tumor type, follow□up duration, and oncological margins. Group A had average MSTS93 score of 22.27 ± 1.01 and average HHS of
91.34 ± 2.85, as compared with Group B which had average MSTS93 score of 20.11 ± 2.57 and average HHS of 82.51 ± 9.77. This difference was statistically significant ($p < 0.001$). No statistically
significant difference was noted in terms of oncological outcomes (local recurrence and distant metastasis) as well as local complications. Comparison of Group 1 (Type I + half) with Group 2 (Type I + II) did not reveal any statistically significant difference in functional and oncological outcomes between the groups. The average MSTS 93 score in Group 1 was 22.07 ± 0.82 as compared with 21.58 ± 3.02 in Group 2 ($p = 0.597$). Similarly, the average HHS in Group 1 was 90.37 ± 2.67 as compared with 86.51 ± 9.67 in Group 2 ($p = 0.205$). However, a statistically significant difference in the functional outcomes was established between Group 3 (Type III + half) and Group 4 (Type II + III), with the former having better functional outcomes, with no difference in oncological outcomes. The average MSTS 93 score in Group 3 was 22.85 ± 1.34 as compared to 19.73 ± 2.05 in Group 4 ($p < 0.001$), and the average HHS in Group 3 was 92.3 ± 4.25 as compared to 80.06 ± 9.56 in Group 4
($p < 0.001$).

DISCUSSION AND CONCLUSION: Hip transposition can be considered as an easy and safe surgical procedure to employ to achieve good functional outcomes in periacetabular tumors. We achieved a good functional outcomes using one manufacturer's mesh for hip transposition in our patients with an overall mean MSTS93 score of 21.25 (70.8%) and mean HHS of 87.16. Our study findings show that preservation of acetabulum (Group A) resulted in the significantly better functional outcomes than complete acetabular resection (Group B) as depicted by better MSTS93 score and HHS, without affecting the oncological outcomes. Also, Type III + half resections resulted in the significantly better functional outcomes than Type II + III resection. This suggests that a Type III + half resection with osteotomy through the acetabulum preserving the superior dome has a functional advantage over Type II + III resection without compromising oncological margins. Preserving as much acetabulum as possible without compromising oncological margins is functionally beneficial with hip transposition. In light of these new findings, we feel that there is a need to revisit and revise the pelvic resection planes that have been seen over three and half decades.