

SPECIAL SURGICAL PROCEDURES IN THE TREATMENT OF PELVIC TUMORS

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Internal Hemipelvectomy

It is well known that until 1975/1980, patients with malignant bone tumors, mainly osteosarcoma and Ewing tumor, were treated with amputation or disarticulation, with disappointed cosmetic, functional and psychological results and poor five-year survival, ranging from 10% to 20%. Before this time, patients used to die of lung metastases because there were not effective drugs for treatment of these diseases. In a trial took place at the Cancer Hospital before 1980, non metastatic patients were submitted to amputation or disarticulation and randomized to receive high dose of oral BCG or non effective drugs.

Five-year survival was not longer than 12% in both groups. The appearance of new effective drugs in the treatment of osteosarcoma after 1975/, like high dose of methotrexate, cisplatin, doxorubicin, ifosfamide and carboplatin and its pre operative use permitted better survival and "en block" resections, including internal hemipelvectomy. These new drugs as well as advances in surgical techniques changed the natural history of osteosarcoma in terms of limb salvage and survival world wide.

A. C. Camargo Hospital played an important role in changing the natural history of osteosarcoma in this country. In the early eighties, we started a trial using pre-operative platinum, 2 or 3 series, followed by surgery and pos-operative chemotherapy with doxorubicin and platinum.

This trial and others permitted us left the era of hundred percent of amputation and 12% of survival before 1980, to the era of high rate of limb salvage and good survival, using different schedules of chemotherapy. Internal hemipelvectomy is an "en bloc" resection of part or all innominate bone with the tumor and soft parts surrounding it.

All the patients should have their primary tumor and lungs evaluated by image methods like CT scan to the lungs, and MRI to the pelvis. Iliofemoral vasculo nervous bundle should be free of disease; its involvement is not in conformity with the procedure. According to resected regions of the innominate bone internal hemipelvectomy is classified to: type I - resection of iliac wing; type II - periacetabular resection, including femur head; type III - resection of the anterior pelvic arc, I mean to say pubis and schium; and type IV - when whole innominate bone is resected. Tumor site and its extension dictates, the type of resection, thus we can perform extended internal hemipelvectomy, for example, extending surgical procedure to the sacral ala and even pelvic part of sciatic nerve, and more or less soft parts.

After the resection, surgical specimen is evaluated and tumor necrosis classified according to the Huvos Ayala system. Tumor necrosis due to pre-operative chemotherapy is one of the most important prognostic factors.

We have not been used prosthesis after a type IV internal hemipelvectomy and other resections types involving acetabulum, and six months to one year after surgery, 50% of these patients are able to be on their feet and support all the weight in the operated side and walk without any kind of support (Fig. 1A and B).

The explanation for this result is a long term pseudoarthrosis developed between femur stump and soft parts. Now a day, the use of prosthesis is controversial. In my opinion, the major objection to the use of this device is that patients lose the flexibility to practice many movements, like walking about without any kind of device, running, up

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Figure 1. Bone loss after a total internal hemipelvectomy

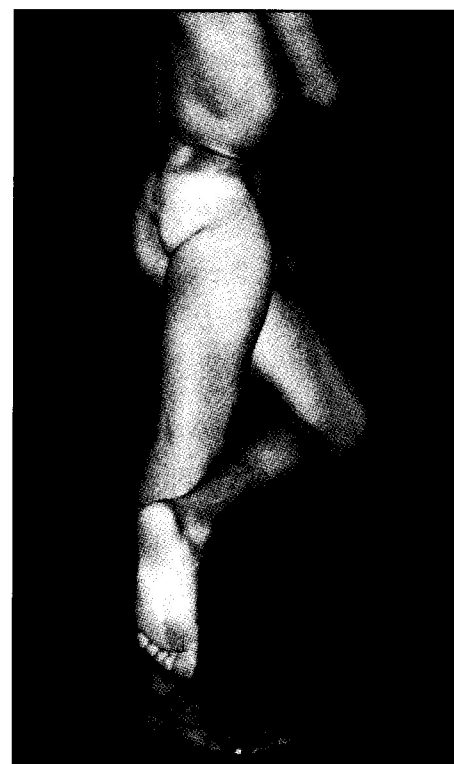


Figure 2. Long term follow-up after a total internal hemipelvectomy. Patient is on his foot supporting all the weight in the operated side.

and down stairs, standing up and sitting down, riding bike and playing soccer. In addition to the flexibility, we must also consider the risk of increased infection, prosthesis detachment and costs. The main problem after a total internal hemipelvectomy is the difference of level, due to a cephalic migration of the femur stump, but it can be satisfactory corrected with a shoe lift. The association of pre and post-operative chemotherapy and surgery in the treatment of osteosarcoma and Ewing tumor, can be considered as a very successful multidisciplinary treatment. Internal hemipelvectomy is a good example of surgical oncology progress in the last two decades. It is easier to perform an external hemipelvectomy than an internal one. Forty patients were submitted to internal hemipelvectomy at the Pelvic Surgery Department of the Cancer Hospital, from 1990 to 1999. Patients' age ranged from 7 to 51 year-old with average of 17.5 years. Twenty two were males and eighteen females. Thirty three were males and seven females. The main symptom was pain in 57.5% of them, followed by tumor and others. Forty per cent of them arrived at the Department intact, 47% had previous biopsy and the other 13% had recurrent tumor. Thirty three patients (82.5%) had primary bone tumors, 6 soft tissue sarcomas with bone extension, and the last one, a recurrence of colon cancer extending to iliac wing, crural nerve, iliac and psoas mus-

cles. Concerning to histological types, 37.5% had Ewing tumor, 32.5% chondrosarcoma, 12.5% osteosarcoma, 15% soft tissue sarcoma and 1, recurrent colon carcinoma. According to the types of resection, 16 patients underwent to total internal hemipelvectomy, 10 to type I resection, 5 to type I plus II tumor resection, 5 to type II plus III, and 4 to type III resections.

Twenty six patients underwent to resections involving acetabulum. The resection was considered curative in 87% of patients and palliative in the remaining. The surgery was considered curative when there was no distant metastasis and no residual disease after resection.

The operative time ranged from 75 minutes to 7 hours with average of 3 hours and 55 minutes. Blood transfusion was necessary in 75% of patients, with a volume from 300 to 3.000 ml and median of 600 ml. Hospital stay range from 4 – 54 days with median of 9.5 days.

There was no intra-operative and post-operative death. Post-operative complications occurred in 30% of the patients. Eight patients had minor complications represented

by: 5 with small superficial dehiscence of the operative wound and 3 with infections in the superficial part of the wound. All of them had a good healing with clinical care. Four patients presented major complications. Two, had infection with deep dehiscence and the others presented necrosis in the external third of the gluteus myocutaneous flap, with infection associated, thus needed debridement and secondary closing of surgical wound. These two patients were submitted to extended total internal hemipelvectomy, including part of the hemi sacrum, dividing gluteus vessels and resection of the intra-pelvic sciatic nerve segment.

Considering overall functional results, 19 patients were able to walk without any kind of support, 17 walk with help of some support, and 1 was in wheelchair and 3 lost of follow-up. If we consider only the 22 patients submitted to curative resections involving acetabulum, 50% were able to walk without any kind of support, 40% needed some kind of support to ambulating and one is in wheelchair.

The follow-up for 35 patients submitted to curative surgeries, ranged from 0.2 to 100 months (median 36.6 months). Their status at the end of this study was: 22 patients are alive without disease; 14% died of cancer, 11% are alive with cancer, 2.9% died of other causes and 3 lost of follow-up. Overall actuarial survival for 35 patients underwent to curative resection was 78.6%. This good overall survival can be explained by short time of follow-up and many cases of low grade chondrosarcoma. The median survival in palliative resection was 25 months. Eleven patients had recurrence, being six local, two distant, and three local and distant.

Internal hemipelvectomy is a good method for local control of disease, with acceptable complications rates and functional and cosmetic gratifying results, when compared to external hemipelvectomy. It is a good example of the surgical oncology progress and multidisciplinary treatment in the last 3 decades.

We had many progress in the treatment and survival of patients with tumor like osteosarcoma, Ewing tumor, Wilms tumor, testis tumor, rhabdomyosarcoma and others. In spite of expressive advances in molecular biology, we had not remarkable progress in the treatment of the most prevalent tumors of the human been, like stomach, breast, lung, prostate colorectal and uterine cervix. I hope that in the near future, we can have new trends to treat those tumors with better cure and survival rates.

Extended resections in the treatment of malignant pelvic tumors

Visceral pelvic tumors can leave their primary site and extend to adjacent organs and or structures without distant metastases. In this condition they are named "locally advanced pelvic tumor" (LAPT).

Considering rectal cancer, the tumor can extend anteriorly to the bladder and prostate in man and to the posterior vaginal wall and internal genital organs in woman. Locally advanced gynecologic tumors, mainly uterine cervix cancer frequently extends to the bladder, rectal anterior wall and vagina. In both genders, the tumor can extend to the sacrococcygeal region.

Approximately 5% to 10% of patients with colorectal cancer have locally advanced disease at the time of diagnosis. Most of them already have previous treatment like classical surgeries, radiotherapy and chemotherapy. We don't know exactly how many of them are candidates to extended resections. This surgical procedure can be the only kind of treatment for a select group of patients with locally advanced pelvic tumors. A rigorous work up to evaluate clinical conditions, tumor extension and psychological aspects is necessary before surgery.

Loco-regional disease should be evaluated by a meticulous digital vaginal and rectal examination. Rigid retro-sigmoidoscopy and cystoscopy are necessary as well as CT scan to evaluate lungs and MRI of the abdomen and pelvis. Tridimensional transrectal ultrasonography can be useful in some cases. Recently pet-scan has been used to achieve a more accurate evaluation of the distant disease in such extensive surgery like these one and sometimes contraindicating the procedure and avoiding morbimortality without survival advantage.

To perform this extensive and complex surgical procedure, it is fundamental for surgeons to have a special training as well as physical and emotional preparedness. After laparotomy, a meticulous exploration of the abdominal and pelvic cavities should be done to evaluate extra pelvic disease and resectability. The decision of resectability determination at the time of exploratory laparotomy presents a challenge to the surgeon. Twenty five to thirty percent of the candidates to pelvic exenteration have tumors considered unresectable after intra-operative laparotomy. Adherence release and or biopsy between the tumor and pos-

sible normal organs should not be performed to avoid tumor spillage. The right time to know if the adhesions are inflammatory or malignant is only after an "en bloc" resection and pathological examination of the surgical specimen. The morbidity associated with extended resections mainly in the total pelvic exenteration range from 26% to 100%. Despite of relative morbidity, post-operative mortality is within in the range of complex surgical oncology procedures rates and range from 1% to 13%. Post-operative mortality has progressively declined in the last two decades due to better patients' selection, improvement in surgical technique and intensive care support.

Metastases beyond the pelvis, tumor extension to the pelvic side wall and lower extremity lymph edema are usual contraindications for pelvic tumors extended resections. Poor clinical conditions, mental and psychological ability to self-care after the procedures, are also contraindications to the procedure as well as the acceptance by the patient of risks and functional results of the operation. Another point to consider when indicating the surgery is the possibility that the intent of the resection can be non curative.

According to resection extension, pelvic exenteration is classified into: anterior, posterior, total and modified. The first one is an "en bloc" resection of the bladder and internal genital organs beside a pelvic lymphadenectomy. The urinary tract reconstruction can be performed by ileal conduit or an orthotopic ileal new bladder. Posterior pelvic exenteration is an "en bloc" resection of the rectum, distal colon, uterus and internal genital organs with or without preservation of the anal sphincter, depending of tumor extension. Total pelvic exenteration involves the resection of whole pelvic organs, with or without preservation of one or both sphincters. The extension of surgical procedure is dictated by tumor extension. We always look to obtain free margins. When the tumor involves the coccyx, sacrum, segment of small bowel or any other structure possible of resection with free margin, surgical procedure should be performed, thus we can do modified pelvic exenteration. The possibility of sphincter preservation has increased the procedure acceptance by the patients.

Pelvic surgery experience department with extended resection in the treatment of visceral tumors: 96 patients underwent to pelvic exenteration (PE) at the Pelvic Sur-

gery Department of the Cancer Hospital, São Paulo, Brazil, from 1980 to 2000.

Patients' age ranged from 16 to 79 year-old with median of 56 years. Twenty were (21%) male and 76 (79%) female. Sixty five (67.7%) had previous treatment, and the other hadn't have any kind of approach. Forty six (47.9) had colorectal tumors, 27 (28.1%) had gynecologic tumors, 15 (15.6%) had urologic tumors and 8 (8.4%) soft tissue sarcomas. Thirty eight (39.6%) underwent total pelvic exenteration (TPE), 29 (30.2%) anterior pelvic exenteration (APE), 20 (20.8%) posterior (PPE) and 9 (9.4%) modified pelvic exenteration (MPE). On 82 (85.4%) patients resections had free surgical margins (RO resection), in 9 (9.4%) microscopic margin were compromised (R1 resection) and 5 (5.2%) had macroscopic compromised margin (R2 resection). TPE and PPE were performed in 41.3% and 43.5% respectively of patients with colorectal cancer. Total pelvic exenteration and APE were the most common surgical procedures for patients with gynecologic tumors. Five of six patients with soft tissue sarcoma underwent to TPE.

The rate of overall sphincter preservation was 37/96 37.5%. Seventeen of twenty eight patients underwent TPE had sphincter preservation, being both in two of them, urinary in one and anal in fourteen. Seventeen percent of the patients that underwent APE had their sphincter preserved, while 45% of those that underwent PPE had anal sphincter preservation. In the modified surgical procedure at least one sphincter was preserved in five patients. The sphincter salvage preservation rate in the eighties and nineties were 18.2% and 47.6%. It can be due to better knowledge in surgical techniques like much more the use of staplers, orthotopic ileal new bladder and changes in the concept of minimal margin in rectal cancer.

The operative time ranged from 4 to 14 hours with median of 7 hours. Blood transfusion ranged from 0 to 6.000ml, with median of 1.000ml. Minor and major post-operative complications were 55.2% and 19.8% respectively. There were 15.6% of post-operative deaths. The hospital stay ranged from 1 to 68 days with median of 11 days.

The minor complications were represented by: skin infection (55.2%), abdominal wall dehiscence (46.2%), intestinal obstruction (2.1%) and urinary tract infection (19.8%). Urinary fistula (10.4%), intestinal fistula

(7.2%), acute renal failure (7.3%), sepsis (5.2%), DVT (3.1%) and cardiovascular events (4.2%) were the main major complications. Patients underwent to R1 and R2 resections were not considered in the evaluation of recurrence. Thirty two patients had recurrence, being 13 local, 8 distant and 3 local and distant. At the end of this study, in median follow-up of 13.8 months, 34.4% of the patients were alive without disease, 28.1% death of cancer, 9.4% live with disease, 4.2% death of other causes, 15.6% died in post-operative time, and 8.4% lost of follow-up.

The five-year-overall survival (Fig. 2) and disease free survival rates were 41.2% and 40.1% respectively. Tumor site had impact in disease free survival but not in overall survival. Patients with colorectal and gynecologic tumors had better DFS and OVS than those with sarcomas and

urologic malignancies, in spite not significant.

Sphincter preservation had no significant impact in disease free survival but was positive factor for better survival maybe due to less extensive disease. The number of infiltrated organs by the tumor and decade of surgical procedures had a significant impact in five-year-overall survival. No patient with five or more organs microscopically compromised survived more than 35 months. The better five year survival in the last decade can be due to a better patient's selection, improvement in surgical technique and intensive care support conditions.

Concluding I would say that extended resections are surgical procedures indicated to a select group of patients with locally advanced pelvic tumors without other kind of available treatment and sphincters preservation did not show to be an adverse factor in survival.

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