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Is there an indication for palliative surgical procedure of shoulder and upper limb malignancies?

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Resumen

Objetivo: las amputaciones mayores no son procedimientos frecuentes en la actualidad, sin embargo, hay un grupo de pacientes aún considerados para estos tratamientos. El objetivo fue evaluar el resultado con esta intervención quirúrgica, así como evaluar la morbilidad, control local, periodo libre de enfermedad y paliación.

Métodos: el estudio incluyó 57 pacientes en quienes se realizó desarticulación interescapulotorácica (DIET) en un periodo de 1974 a 1993. Los pacientes con patología oncológica quienes fueron operados con objetivo paliativo. Veintiocho hombres y 29 mujeres, con edad promedio de 44 años (margen 13 a 79 años). La presentación clínica fue caracterizada por tumor (100%), dolor (46%), incapacidad funcional (39%), ulceración (32%) y hemorragia (9%). Promedio de Karnofsky 80% (margen 50 a 100%). El tiempo de evolución fue de 25 meses (margen 1 a 121 meses), y la medida del tumor mayor de 10 cm en 86% de los casos.

Resultados: Las complicaciones postoperatorias fueron en 10 casos con infección en cinco casos, hematoma en el lóbulo superior del pulmón en dos casos, trombosis femoral, necrosis de la piel y hemorragia en un caso respectivamente. La paliación fue evaluada en términos de eliminar carga tumoral, ulceración, hemorragia, incapacidad funcional, dolor pre y postoperatorio. La supervivencia global fue de 12 meses (margen 1-139 meses).

La desarticulación interescapulotorácica es una cirugía que se realiza con poca frecuencia con baja morbilidad y mortalidad, baja recurrencia, sin efecto en la supervivencia y con resultados de paliación excelente.

Palabras clave: desarticulación interescapulotorácica, amputación.

Summary

Aims: Major amputation is not a frequent procedure at present, however, there is a group of patients still considered for these treatments. Our objective was to evaluate the results of this surgical intervention as well as to evaluate morbidity, local control, free disease, and palliation.

Methods: The study included 57 patients on whom interscapulothoracic disarticulation (STDI) was carried out at the Instituto Nacional de Cancerología were (Mexico City) from 1974 to 1993. Patients with oncologic pathology were operated with a palliative aims. Twenty eight male and twenty nine female patients were found with average age of 44 years (range: 13 to 79 years). Clinical situation was characterized by tumor (100%), pain (46%), functional incapacity (39%), ulceration (32%), and bleeding (9%), Karnofsky 80% (range, 50 to 100). Time of evolution was 25 months (range: 1-121 months) and size was > 10 cm in 86% of cases.

Results: Postoperative complications were present in ten, followed by patients follow infection in five cases, hematoma in the upper lung lobe in two and femoral thrombosis, skin wound necrosis, and bleeding in one case each. Palliation was evaluated to eliminate tumoral load, ulceration, bleeding, functional incapacity, and pre- and postoperative pain. Global survival was 12 months (range, 1-139 months).

Conclusions: Interscapulothoracic disarticulation is an infrequently performed surgery with low morbidity and mortality, low recurrence, no effect on survival, and excellent palliative results.

Key words: Interscapulothoracic disarticulation, Forequarter amputation.

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Introduction

Interscapulothoracic disarticulation (STDI) was first carried out in 1808 by Cuming⁽¹⁾ in a non-oncologic patient. Crosby⁽²⁾ in 1836 was the first to carry out STDI in the U.S. for treatment of cancer. Berger described the technique in 1887, Buchanan presented 141 cases before 1890, and George T. Pack⁽³⁾ reported 180 cases in the literature from 1900 to 1942 and 31 cases from his own experience.

At that time, major amputation was considered the classical or orthodox method for treatment of cancer⁽⁴⁾. Early

diagnosis and advent of treatments with chemotherapy and radiotherapy (RT) diminished this type of radical surgery, replaced in great measure by more conservative limb surgery such as the Tikhoff-Linberg⁽⁵⁻⁷⁾, with better quality of life and same local control. Nevertheless, for some patients STDI is the only treatment possible in terms of curative or palliative intent when conservative measures such as chemotherapy and radiation are usually attempted for local control and pain relief. If these fail, the disease progresses. Relentless growth may lead to tumor fungation, sepsis, and hemorrhage. This may be due to great tumor load as well as to the fact that some patients may develop sarcomas in the soft tissues or osteosarcomas after treatment with RT, 5% and 0.05 to 0.23%, respectively⁸⁻¹⁰.

STDI may be combined with thoracic wall resection when in addition to involving shoulder articulation and with pleurectomy or pneumonectomy, these structures are implicated by contiguity^(11,12). In a few cases, STDI is indicated in illnesses such as lymphedema of thoracic limb after radical dissection of axial with or without lymphomatous sarcoma (Stewart-Treeves syndrome), acute trauma management, and neurofibromas of brachial plexus, the latter associated to Von Recklinghausen⁽¹³⁻¹⁵⁾ at 10 to 15%.

This study is a retrospective analysis of patients who underwent palliative STDI for tumors involving shoulder girdle region. The objective of this report was to analyze STDI in terms of morbidity, local control, disease-free intervals, and palliation.

Material and methods

From 1974 to 1993, 57 patients were treated surgically with STDI (28 males and 29 females with mean age of 43 years, range, 13 to 79 years) at the Skin and Soft Tissues Tumors Surgical Service of the Instituto Nacional de Cancerología in Mexico City. There were 20 soft-tissue sarcomas, 21 bone tumors, 11 skin cancers, three lymphomas, and two cases of other tumors (Table I). Staging was performed according to the American Joint Committee on Cancer (AJCC)¹⁶ for each histology type. Forty four (77%) patients were in advanced clinical stage, as shown in Table I.

The clinical picture was as follows: tumoral mass in all 57 (100%) patients; mean time of evolution of symptoms was 25 months (range, 1 to 121 months) prior to first visit to the hospital, and Karnofsky performance status (KPS) mean was 80% (range, 50 to 100%). Diameter of the tumor in 24 patients ranged from 10 to 20 cm; in 12 patients, diameter was between 21 and 30 cm, in 10 it was 31 to 40 cm, and in three patients, diameter ranged from 41 to 50 cm tumor was not measured in eight patients. These patients had one or more of the following symptoms: 26 (46%), pain; 22 (39%), had functional incapacity; 18 (32%), ulceration; five (9%)

patients had bleeding; two (4%) had weight loss, and one (2%) had miasis.

Preoperative evaluation was carried out to discard metastasis. Information was obtained based on X-ray and tomographies performed during the first years; computed tomography (CT) was employed during subsequent periods. Twenty eight (49%) patients presented metastatic disease at moment of diagnosis (Table II). Fourteen (25%) patients received neoadjuvant, adjuvant, or palliative treatment based on chemotherapy and 20 (35%) received radiotherapy. The surgical objective was palliative in all cases due to large size of tumors. Follow-up of these patients was every 3 months during the first year and every 4 months thereafter.

Indication for STDI was for great tumoral extension or invasion of neurovascular bundle as well as the impossibility of carrying out conservative limb surgery, severe intractable pain with loss of limb function, and one or more of the following local tumor-related complications: tumor fungation; hemorrhage; sepsis, and ulceration. Surgery was done according to Berger method as modified by Pack⁽¹⁾. In all cases, surgical margin of 5 cm was afforded; when this was impossible, extensive surgery was effected, including thoracic wall resection with reconstruction of same, employing Marlex mesh to maintain thoracic stability, and/or flap rotation when it was impossible to cover mesh by of direct cutaneous closure.

Results

In 52 patients only, STDI was carried out, while combined STDI with resection of thoracic wall was performed in four cases; an additional patient had STDI plus total thyroidectomy because of shoulder metastatic disease from papillary thyroid carcinoma.

Mean surgical time was 157.2 min (range: 1 to 5 h). Mean bleeding during surgery in 51 patients was 806 cc (range, 30 to 3,000 cc) and porto vac drainage ranged from 2 to 20 days (mean: 6.9 days).

Postoperative complications occurred in 10 patients (18%). Infection was present in five (9%), hematoma in upper lung lobule in two (4%), and femoral thrombosis, skin wound necrosis, and bleeding in one patient each (2%).

The study group consisted of twenty six (46%) patients who experienced preoperative pain; among these, 14 (53%) manifested postoperative phantom limb and four (15%) experienced the pain component. Thirty one (54%) patients did not present preoperative pain; however, 15 (48%) had postoperative phantom limb with pain component in eight (26%) patients.

Five (9%) patients had local recurrence and postoperative metastatic disease was present in 26 (46%) patients (Table II). Mortality was not related to surgery. Fourteen (24%)

patients died within the first month, nine (16%) patients within the second and third months, 13 (23%) patients between the third and sixth months, 11 (19%) patients between the sixth and twelfth months, and 10 (18%) of patients died after 12 months.

Discussion

STDI is one of the most mutilating surgical procedures. Its use has been reduced over past decades mainly due to treatments with neoadjuvant chemotherapy and/or radiotherapy. With these treatments, better rates of local recurrence were obtained, which allowed to increase use of conservative procedures in extremities. However, amputation surgery is not an abandoned idea at present.

This is a retrospective analysis of 20-year series that contained a heterogeneous group of tumors in which 25% of patients received different schemes of chemotherapy and in which chemotherapy treatments evolved during the period. For this reason, it was difficult to obtain conclusions based on chemotherapy. KPS in our series was not low (mean, 80%); however, low KPS is not a contraindication for STDI to improve the patient quality of life⁽¹⁷⁾.

Among prognostic factors we were able to obtain were time of disease, evolution, which was 25 months on average (range, 1-121 months) prior to admission of the patient to our institution. Likewise, tumor size was > 10 cm in 86% of cases, without our knowing tumor size exactly in eight (14%) cases (Table I). Principal indication for STDI

was presence of great tumoral volume; 60% of patients in this series who underwent conservative measures such as radiotherapy and/or chemotherapy that failed to prevent tumor progression. Tumors that failed to respond to such measures continued to grow and caused local complications and frequently a painfully agonizing death. In this series, amputation was advocated as a palliative procedure for symptomatic locally advanced disease that had already failed to respond to radiation therapy and/or chemotherapy. This indicated that from the beginning, the majority of patients were found on palliative ground, understanding palliative to be the group of patients with symptoms such as pain (46%), functional incapacity (34%), ulceration (32%), bleeding (9%), weight loss (4%), and infection (2%). Therefore, infection, ulceration, and bleeding were palliative in 100% of our patients in an objective manner. Several clinical situations have been raised in the literature as indications for palliative forequarter amputation, such as intractable pain, sepsis, tumor fungation, hemorrhage, vascular thrombosis, pathological fracture, radiation-induced necrosis, or limb with several functional impairment⁽¹⁸⁻²⁰⁾, as occurred in several of our cases due basically to presence tumor of the great size. Malawer et al⁽²¹⁾ considered that presence of pain alone was not a clear indication for amputation such as the forequarter, but we agree with Mirimsky et al⁽¹⁷⁾, who considered pain alone as a clear indication for palliative forequarter amputation. Pain was the principal symptom in 26 (46%) of our patients, and this symptom persisted in four patients after surgery in the form of painful phantom limb. However,

Table I. Histopathologic diagnosis and clinical stage

Diagnosis	I	II	III	IV	Non-classified	N (%)
Osteosarcoma	0	12	0	3	0	15 (26.3)
Epidermoid carcinoma	0	0	3	6	0	9 (15.7)
Malignant fibrous histiocytoma	0	0	5	3	0	8 (14)
Malignant schwannoma	0	0	2	3	0	5 (8.7)
Chondrosarcoma	0	0	3	1	0	4 (7)
Non-Hodgkin lymphoma	0	0	3	0	0	3 (5.2)
Liposarcoma	0	0	1	1	0	2 (3.5)
Malignant melanoma	0	0	1	1	0	2 (3.5)
Synovial sarcoma	0	0	2	0	0	2 (3.5)
Giant cell tumor	0	0	0	1	0	1 (1.7)
Fibrosarcoma	0	0	1	0	0	1 (1.7)
Angiosarcoma	0	0	0	1	0	1 (1.7)
Ewing's sarcoma	0	1	0	0	0	1 (1.7)
Rhabdomyosarcoma	0	0	1	0	0	1 (1.7)
Fibromatosis (desmoid)	0	0	0	0	1	1 (1.7)
Papillary carcinoma*	0	0	0	1	0	1 (1.7)
Total	0	13	22	21	1	57 (100)

*Primary tumor was in the thyroid gland.

31 (54%) patients did not experience preoperative pain, while eight did experience painful phantom limb. (In this regard, we did not find an explanation for the phenomenon). Phantom limb pain was reported in 60-90% of amputees⁽²²⁾. It may be more prevalent in cancer patients who have undergone amputation, particularly those exposed to chemotherapeutic agent. Incidence of phantom limb pain may be greater also in patients who experienced prolonged preoperative pain and pain in immediate postoperative period than in those who did not. Another explanation by other authors is that it is possible that emotional factors are influential in patient experience of prolonged pain in a phantom limb. It is obvious that functionality of the limb is not preserved, as this is a radical surgery of the limbs. We must take into account that this is a retrospective study and it is, therefore, difficult to obtain numeric objectives with respect to quality of life. For this reason, it is important to have pre- and postoperative evaluations.

In this series, we recorded 48% preoperative and 46% postoperative metastasis. This is not surprising, as large tumors were present and as it is known, in tumors > 5 cm the possibility of distant metastasis is 60-70%, depending on histologic type. This explains patient mortality of 40% during the first 3 months and 63% at 6 months. When we compared this survival rate with other series^(4,23,24) in which survival is 35% at 5 years, tumor volumes may be the difference in terms of survival, which in our series was < 20% at 3 years; however, survival ultimately had no meaning because the procedure was palliative. Short survival of our patients at present is not a contraindication for STDI, when tumors are as big as those mentioned in this series. The role of survival calculation was to show that the patient had palliative effects prior to succumbing to their diseases. Lung metastasis was the dominant cause of death in our patients. Nonetheless, novel methods should be explored in detection of subclinical metastatic dis-

ease for patients with bone sarcomas, unclassified sarcomas, or undifferentiated tumors who develop systemic metastasis postoperatively during the first 6 months; in addition, it individually is necessary to evaluate palliative value for each patient even in the presence of metastatic disease to justify carrying out or not of this procedure, which continues to have high psychological impact. In 9% of patients, local recurrence was present, which is low. Nevertheless, this should be considered a systemic disease⁽²⁵⁾. Morbidity in this series was high at 18% when compared with Ham's series⁽²³⁾ in which there was null morbidity. Mortality related to surgical procedure was null, similar to other series⁽²³⁾.

STDI remains an effective procedure for local control of tumors of different histologic pedigree localized in glenohumeral articulation. One main indication for this procedure is recurrent soft-tissue sarcoma in which a conservative procedure was performed initially STDI should remain a rarely used surgical procedure important in management of sarcomas or undifferentiated tumors with palliative aims as the principal indication. Despite the short survival time in our series, we believe that interscapulothoracic disarticulation in its palliative form was justified due to the fact that the procedure provided pain relief and permitted the patient some independence. Thus, we could say that the benefit of any palliative procedure is difficult to quantify, but relief of pain, ulceration, and necrosis has a high priority.

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Table II. Distribution of metastatic disease according to site.

Site	Preoperative	Postoperative	Total
Lung	14	18	32
Thoracic wall	4	0	4
Nodes	6	4	10
Skin	2	0	2
Bone	1	2	3
Diaphragm	1	0	1
Liver	0	1	1
Central nervous system	0	1	1
Total	28	26	54

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