

AMPUTATION FOR TUMOR OF THE UPPER ARM

S. BLÄDER, B. GUNTERBERG & G. MARKHEDE

Department of Orthopaedic Surgery II, University of Gothenburg, Gothenburg, Sweden

In a 10-year period 35 patients underwent a proximal amputation of the upper limb because of a malignant tumor. In 27 patients a forequarter amputation was made, in one a humeroscapular disarticulation and in seven an amputation through the humerus. The observed 5-year survival was 23 per cent. Twelve out of 23 patients followed for at least 3 years also survived 3 years. Fifteen living patients were questioned concerning prosthetic use and social and psychologic factors. Only three patients used a functional (mechanical) prosthesis and only five used a cosmetic prosthesis. The other seven patients rejected the use of a prosthesis. Half of the patients had the same occupation postoperatively as preoperatively. Activities of daily living did not constitute any major problem. One of three housekeepers needed daily help. One patient seemed to have suffered obvious psychologic damage.

Key words: amputation; arm; bone tumors; prosthesis; soft tissue tumors; surgical treatment

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Major amputations of the upper extremity, especially interscapulothoracic amputation, are extremely disabling and disfiguring operations. The indication for such an amputation is usually a lifethreatening tumor of the arm and shoulder. Surgery may be done both for curative and palliative reasons.

When planning such an operation knowledge about postoperative function and social life is as essential as finding out the survival rate one can expect. Only few reports can be traced in the literature concerning these problems. The purpose of this investigation was to make a survey of the indications, prosthetic use and function, social and psychological aspects as well as survival in patients who have undergone major amputation of the upper extremity because of a malignant tumor.

MATERIAL AND METHODS

During the period 1971–80, 35 patients underwent forequarter amputation, disarticulation of the humeroscapular joint or amputation through the humerus because of a malignant or locally aggressive tumor in the Department of Orthopaedic Surgery II, Sahlgren Hospital, Gothenburg.

In 30 patients with a primary bone or soft tissue tumor the amputation aimed at cure. In five patients with metastatic tumor the amputation was made for palliation.

In this retrospective study the medical records were reviewed and a follow-up was done in mid 1981. All patients alive also answered a questionnaire with emphasis on activities of daily living, psychological aspects, working conditions and prosthetic use and function.

RESULTS

Descriptive data

The cause of amputation was in 34 patients a malignant tumor and in one patient an extra-ab-

Table 1. Histological diagnosis of the tumors

<i>Malignant bone tumors</i>	8
Osteogenic sarcoma	5
Chondrosarcoma	3
<i>Malignant soft tissue tumors</i>	21
Synovial sarcoma	5
Malignant schwannoma	4
Malignant fibrous histiocytoma	5
Myxofibrosarcoma	2
Leiomyosarcoma	2
Malignant giant cell tumor of soft tissue	1
Unclassified malignant mesenchymal tumor	1
Alveolar rhabdomyosarcoma	1
<i>Extraabdominal desmoid</i>	1
<i>Metastatic tumors</i>	5
Total	35

dominal desmoid (benign but locally aggressive tumor).

Male:female ratio was 25:10. The age ranged between 11 and 75 years, average 46 years.

In 27 patients a forequarter amputation was done; 22 patients had a primary malignant tumor, four metastatic tumor and one a benign tumor. In seven patients an amputation through the humerus was done; six patients had a primary malignant tumor and one a metastatic tumor.

The histological diagnoses of the tumors are shown in Table 1. Twenty-two tumors originated in soft tissue and eight from bone. Five patients had a metastatic tumor.

Survival

The follow-up time was 7 months – 10 years (average 4.5 years). Of these patients 13 were followed 5 years or more and only three survived 5 years. Twelve out of 23 patients followed for at least 3 years also survived 3 years.

Of the 10 patients with a forequarter amputation and a 5-year follow-up three survived. The calculated 5-year survival for the whole group was 20 per cent. The survival rate for all malignant tumors is given in Figure 1. Altogether 20 patients succumbed to their disease.

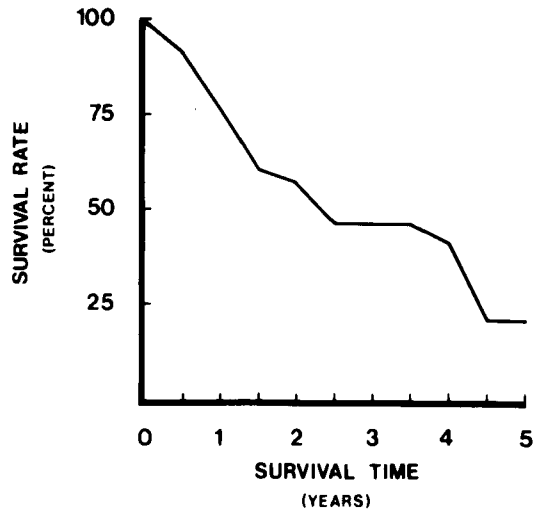


Figure 1. Survival curve of 34 patients following amputation for malignant tumor of the upper arm.

Prosthetic use and social life in 15 living patients

Fifteen patients were seen at follow-up. Ten were male and five female. The age distribution was 16–67 years (average 46 years). The follow-up time was 10 months – 6 years (average 3.3 years).

Eleven patients had a forequarter amputation, one a humero-scapular disarticulation and three an amputation through the humerus. Seven of these 15 patients were amputated on the dominant side. Only three out of 15 patients used a functional prosthesis; five had a cosmetic prosthesis which was used only sporadically.

Five patients with a forequarter amputation used a cosmetic prosthesis and five did not use a prosthesis at all. Only one patient used a functional arm.

Five patients had the same occupation post-operatively as preoperatively (e.g. bus-driver, housekeeper, farmer and nurse aid) but were in some aspects dependent upon help of others. Five patients were given disablement pension and three studied in order to get a job suitable for a one-armed person. One mentally disabled patient was admitted to the same institution postoperatively as preoperatively.

All the amputees managed activities of daily living on their own but were dependent on tech-

Table 2. Amputation effect on social and psychological factors in relation to amputation level

	Same occupation	Change of occupation	Disablement pension	Need of daily help	Decreased social contacts	Postoperative psychological problems
Forequarter amputation 11 patients	4	4	2	4	1	1*
Humeroscapular disarticulation 1 patient			1	1		
Amputation through the humerus 3 patients	1		2			

* Same as with decreased social contacts.

nical equipment facilitating cutting etc. Three patients were housekeepers and one of them needed daily help in housekeeping.

Twelve patients declared that their social contacts were the same as before. One thought his social contacts had diminished, and two that they had increased. Six patients were members of a handicap organization but no one took part in sports, except one who was a golfer.

Ten patients did not seem psychologically adversely affected postoperatively in any obvious way. Three patients did not want to go out as much as preoperatively, and one of these had regular difficulties sleeping. One other patient only stated sleeping problems, and one had regular psychologic treatment. The sociopsychological aspects are summarized in Table 2.

One patient had severe phantom limb pain and used analgesics daily. The rest of the patients had moderate phantom limb pain.

DISCUSSION

This study covers a 10-year period in a department which serves a population of approximately 2.5 million people regarding orthopaedic tumors. The incident of malignant tumors requiring proximal amputation of the upper limb should thus be close to 1.4 per million inhabitants and year.

Most patients (27/35) had a forequarter amputation which reflects the fact that the main in-

dication for this kind of surgery was a life-threatening malignant soft tissue tumor.

The survival figures in our series are somewhat smaller than what has been published by Pack & Ariel (1958) who reported a 33.3 per cent 5-year survival after forequarter amputation for malignant primary tumor. The 5-year survival rates of Gläser & Schauer (1979) after forequarter amputation (20 per cent) are more in accordance with our results. Franklin et al. (1977) reported on 184 similar procedures. One hundred and seventy-nine patients underwent a forequarter amputation to control a malignant tumor. Eighty-eight had a primary tumor of bone and 87 a soft tissue tumor. Of the patients with bone tumors 16 were alive more than 5 years after operation. Of the patients with soft tissue tumors, 17 were alive more than 5 years after operation.

The questioning and examination of the 15 patients enabled us to somewhat clarify the life conditions of these crippled patients. Few reports discuss these aspects. Eleven out of 15 patients had a forequarter amputation. One out of 11 patients with a forequarter amputation used a functional prosthesis (with mechanical locking devices for elbow joint and hand grip). Two out of three patients with amputation through the humerus had this kind of functional prosthesis. All patients were offered a functional prosthesis, and some tried one and rejected it. It appears that few patients with a proximal amputation of the upper limb can use a functional prosthesis, or the pa-

tient thinks that the discomfort of a rather heavy prosthesis counterbalances the functional improvements.

One third of the patients went back to their previous work, which in several cases was rather heavy and at first glance would not seem to fit a one-handed person. Of three patients who used a functional prosthesis, two had disablement pensions and one was a housekeeper.

The activities of daily living did not constitute any major problems for any of the patients. Simple tools and technical aids were sufficient for the management of all significant activities.

The psychological aspects of being one-handed were difficult to sort out, as most patients were in some degree mentally affected by the fact that they had been treated because of a malignant disease. Nevertheless, only one patient seemed to be seriously affected. Almost all patients lived an unchanged social life postoperatively.

Phantom limb pain is a very common complaint and difficult to treat in most newly amputated patients. In the long run most patients do not complain any more. In this study no patient got rid of his pain, but all except one grew accustomed to the discomfort and did not need analgesics.

The low 5-year survival rate (20 per cent) after such extensive and disabling operation may justify the use of alternative surgery. One way is

local extirpation of a soft tissue sarcoma in combination with pre- or postoperative radiation therapy. This type of treatment has been reported to give as good local control of the primary tumor as ablative surgery with preserved extremity function in 80 per cent (Suit 1976).

Function-preserving surgery can be considered even for bone tumors with a location which enables segmental bone-resection followed by some type of bone or joint reconstruction.

In some patients the tumor has a size and location which makes a function preserving operation impossible. Ablative surgery should be considered only in patients with non-disseminated disease, unless the arm is functionless and extremely painful.

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