Rotationplasty—quality of life after 10 years in 22 patients

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ABSTRACT – We assessed the long-term results in 22 patients with rotationplasty after resection of high-grade malignant bone tumors. We used established methods (QLQ-C 30; FLZ) to evaluate the quality of life, diplomas, life-contentment, occupational situation and marriage status. After 10-year follow-up, we found no reduction in psychosocial adaptation, and life contentment was about the same as in healthy persons. We therefore recommend rotationplasty instead of amputation whenever conventional limb salvage is impossible.

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Limb salvage procedures have become the standard in bone tumor surgery (Sweetnam 1989, Kotz 1993). However, extension of some tumors of the distal femur makes it impossible to perform limb salvage safely. In most of these cases, the results of rotationplasty and above-knee amputation are similar as regards the oncological resection margins (Enneking 1983) and the alternatives must be discussed with the patient. Some surgeons refuse to perform rotationplasties because of the cosmetic result. A main argument is that the psychic well-being and social rehabilitation of these patients will be severely affected. We therefore evaluated rotationplasty in patients with a follow-up of at least 10 years concerning their quality of life and various psychosocial parameters.

Patients and methods

22 patients who had had a rotationplasty and who had survived at least 10 years or more were selected from the Cooperative Osteosarcoma Study and the Cooperative Ewing's Sarcoma Study. 5 of them had been evaluated previously (from different aspects) (Hillmann et al. 1999). The mean follow-up was 12 (10–18) years.

All patients were assessed with a standardized questionnaire and the number of surgical revisions, degrees, occupational situation and marriage status were recorded.

Life-contentment was measured with the Freiburger life-contentment list (FLZ) (Henrich and Herschbach 1995, 1996). The latter instrument distinguishes between contentment and importance of the particular item for the patient. For example a very high contentment for the item "residential situation" is relative, if the item "residential situation" is completely unimportant for this person. According to the scoring procedures of the FLZ, a weighted life contentment is worked out by the values of contentment and importance. By using the FLZ, we also compared the former tumor patients with the West German general population (Henrich and Herschbach 1995, 1996, Graf et al. 1998).

Quality of life was assessed with the quality of life questionnaire (QLQ-C30) of the European Organization of Research and Treatment of Cancer (EORTC) (Aaronson et al. 1993). 18 of 22 QLQ-C30 questionnaires could be used.

These methods should permit the amount of physical, mental and social well-being to be portrayed as extensively as possible according to WHO criteria (World Health Organization 1947, Bernhard and Hürny 1995).

Table 1. FLZ-general condition

	West Germany n 1688		Rotationplasty n 22	
	Mean	SD	Mean	SD
Friends	8	7	12	6
Hobbies	7	6	8	7
Health	8	8	11	7
Income	7	7	4	8
Job	6	7	6	8
Residential	9	6	12	6
Family	10	7	12	7
Partner/sex	8	8	11	8
Total	63	38	75	31

Table 2. FLZ-health

	West Germany n 1070		Rotationplasty n 22	
	Mean	SD	Mean	SD
Friends	8	7	12	6
Capability	8	7	6	7
Relaxation	8	7	8	7
Energy	10	7	11	7
Locomotion-ability	9	7	11	7
Eyes/ears	11	7	10	7
No fear	8	7	7	6
Pain-free	9	7	10	9
Needs no help	13	7	16	5
Total	76	42	78	35

Table 3. QLQ-C30 questionnaire. Percentage (SD)

	Rotationplasty (n 18)	General population (n 1956)
Function scales		
Physical	89 (16)	90 (20)
Role	82 (32)	93 (29)
Emotional	74 (27)	83 (19)
Cognitive	94 (14)	87 (21)
Social	84 (25)	86 (25)
Global quality of life	83 (22)	75 (24)
Symptom scales		
Fatigue	15 (19)	29 (25)
Nausea/vomiting	3 (9)	4 (11)
Pain	9 (20)	20 (28)
Dyspnea	7 (18)	14 (24)
Insomnia	7 (14)	20 (28)
Appetite loss	6 (17)	7 (19)
Constipation	2 (8)	11 (22)
Diarrhea	6 (17)	9 (20)
Financial difficulties	7 (24)	9 (23)

Results

Median age at the time of study was 28 (18–49) years. 8 of 22 patients with rotationplasty needed a total of 21 surgical revisions. 5 patients (3 male) were married and had at least 1 child.

The distribution of diplomas and occupations showed that the patients had striven for an academic commercial career. Half of the patients had a high school diploma. The operation on the tumor had not affected the choice of profession in 12 patients.

The FLZ questionnaire is divided into 2 parts called "general condition" (Table 1) and "health" (Table 2). The patients who had had tumors had no essential deficiences in their overall "general condition" when compared with the general population.

Although the patients were less contented in the item income and job, this was compensated by more contentment in the other items. Especially for the items partnership and sexuality, no differences were found between those with rotationplasty and the general population.

The part concerning health showed deficiencies in the item capability and no fear. Thus the FLZ questionnaire shows no significant differences in both parts.

The EORTC QLQ-C30 has function scales and symptom scales. All values are expressed as a percentage, where 100% is the maximum. A high value on a function scale is a good result, but a high value on a symptom scale is a bad one. Function scales and global quality of life on the EORTC QLQ-C30 (Table 3) were at least 74%. Persistence of symptoms existing even years after the end of therapy, did not exceed the values of the general population (Fayers et al. 1998).

Discussion

In the 1970s and 1980s, amputations were recommended for the surgical treatment of sarcomas in the distal femur (Sweetnam 1975, Kotz 1978). The rotationplasty described by Borggreve 1930 and Van Nes 1950 was used by Salzer et al. (1981) as an alternative procedure for distal femoral tumors. Winkelmann (1983, 1986, 2000) widened the indication to tumors in the proximal femur.

Today, bone sarcomas are commonly treated with limb salvage surgery (Sweetnam 1989, Kotz 1993). However, some situations still arise when an ablative procedure cannot be avoided. The 2 main reasons for such a decision are the oncological priority (life before limb) and the patient's age. If the tumor is large and involves nerves and vessels, limb salvage may be impossible. Another reason is the patient's age. The implantation of megaprostheses in young children is not satisfactory, because of the size of the bone and resection of the growth plates, which cause marked differences in leg length.

In these situations, rotationplasty should be considered as an alternative to amputation. Our study should help decision-making in these situations. It has been suggested that the enormous change in appearance due to a rotationplasty is followed by considerable difficulties in psychosocial functioning. This is based on the assumption that the psychosocial rehabilitation of an amputation is better or easier.

However, reliable studies comparing limb salvage and amputation have shown minor differences in psychosocial outcome (Sugarbaker et al. 1982, Weddington et al. 1985, Hays et al. 1992, Postma et al. 1992, Eiser et al. 1997, Felder-Puig et al. 1998). A recent study by Renard et al. (2000) reported better function after limb-salvage than after amputation. However, in most of these studies the groups almost always consist of patients who have undergone various surgical procedures in different sites. Rotationplasties have been listed as an ablative or a salvage procedure in various studies.

The mean score of the global quality of life after 10 years was 83 (SD 22), which is similar to 77 (SD 22) found by Veenstra et al. (2000) after an intermediate follow-up of 6.3 years. Thus our study shows that this value does not decline with long-term follow-up.

The patients seems to adapt well to the sequelae perhaps because of their young age and ability to compensate (Eiser et al. 1997). The functional advantage of a rotationplasty has been shown in several studies. Hillmann et al. (1999) found it to be the same as after endoprosthetic reconstruction in bone tumor surgery. Gait analyses showed good functional restoration of gait after rotationplasty (Hillmann et al. 2000). These results are lasting, as noted by Hanlon and Kraijbich (1999). Our study shows that this functional benefit is not offset by late psychosocial effects.

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