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Surgery for bone metastases

Guest Editorial

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One of the ominous and terrifying signs of the distant spread of a primary carcinoma is the painful bone metastasis. Less often, the primary tumor itself causes pain. As it is not rare for metastases to appear quite a long time after the end of the initial treatment, they may cause a disastrous shock for the patient, who believes or at least hopes he has been cured. Thus, in meeting patients with metastatic bone disease one has to handle all the problems of desperate fighting or resignation, and not only medical experience but also experience of life will be needed to manage the situation.

Figures on the incidence of bone metastases differ widely depending on the method of detection. Radiography will eventually show bone involvement in 20–60% of all cancer patients, whereas bone-scanning demonstrates such lesions in 60–80%. Carcinomas of the breast, the prostate, the lung, the thyroid and the kidney cause the majority of metastatic bone lesions. Malignant disease of the gastro-intestinal tract, including the oesophagus, will cause spread to bones only to a lesser degree. Breast carcinoma alone induces about 50% of all bone metastases. In sarcoma, pulmonary metastases dominate and secondary bone lesions are rare.

Modern aggressive cancer treatment not only increases survival, but also prolongs the survival time in eventually fatal cases. This means that an increasing frequency of metastatic bone-tumour problems is encountered. Furthermore, different types of cancer display different patterns of survival. Survival times of 15 years or even more, with existing or late-appearing bone metastases are not unknown in carcinoma of the breast, the prostate and the kidney. Thus, in orthopaedic oncology the problem of secondary bone lesions will be met with much more often than in the past.

The axial skeleton, i.e. the spine, the pelvis and the ribs, is the most common site for metastatic bone lesions. In the long bones the proximal part is generally affected, particularly the proximal femur and to a lesser degree the proximal humerus. Metastatic bone lesions distal to the elbow or the knee are uncommon. However, even in these sites an increased number of lesions is observed today.

In secondary bone lesions, pathological fractures occur in the order of 10–30%; the proximal femur is responsible for about 50% of all these emergencies. The incidence may be exemplified by the Swedish figures for breast carcinoma: of 4000 new cases annually, 400 patients will eventually sustain a pathological fracture, more than 100 being located in the proximal femur.

Thus, pain and/or pathological fractures are the indications for surgical treatment of metastatic bone lesions. Occasionally surgical intervention may also be part of the cure, as in carcinoma of the kidney, in which condition the bone tumour may be the single metastasis. Orthopaedic surgery now has tools to treat many of these problems successfully. After resections in the hip, the knee or the shoulder areas, function can be restored with the aid of endoprosthetic devices; custom-made endoprostheses make it possible to replace even large defects after resection. Reinforcement of fractured or weak bone may be achieved by different methods of osteosynthesis, often combined with bone cement. It is thus possible immediately to stabilize fractures of the long bones and so give the patient an acceptable and pain-free function of the maimed extremity. Also, in the case of spinal involvement with pain and/or neurological disturbance, surgery may give great relief. Different kinds of spinal instrumentation, as used in spinal fracture surgery, may give stability to a spine which has

collapsed because of metastatic disease. Pain and/or medullary symptoms may diminish or disappear and a paraplegic or even tetraplegic cancer patient may have his walking ability restored.

Often the question arises whether to treat a non-fractured bone metastasis surgically or by other oncological therapy. Then the risk of impending fracture has to be calculated. No specific rules can be given for prophylactic measures as the general state of the patient, the activity of the carcinoma and the possible multiplicity of bone lesions have to be taken into account. As a general guide, however, it seems that lesions of the long bones involving 50% of the cortex and having a diameter of 3 cm need prophylactic surgery.

It should be recognized that surgery is only one of the methods of palliation in metastatic bone disease. Close co-operation is necessary between the oncologist and the orthopaedic surgeon to decide on the proper methods and the proper order of methods in the treatment. However, there is still a great uncertainty regarding the staging of therapeutic modalities. A pathological fracture should of course be treated as an emergency. But it is not uncommon to be faced with the problem of multiple metastatic bone lesions at different degrees of evolution. The timing between surgery and different adjuvant measures will then be of utmost importance. Thus, should cytostatic treatment be instituted before or after surgery, or should surgery, for example, be interposed at a special stage in a cytostatic protocol? The same question is relevant to the use of radiotherapy, which is sometimes claimed to enhance fracture healing in metastatic lesions, but is mostly regarded as diminishing osteogenesis. Furthermore, methods of medical treatment of the osteolysis caused by bone metastases seem to be a field of developing interest. Inhibitors of prostaglandin-synthesis such as indomethacin have been reported to be effective in *in vitro* systems, but seem to be disappointing at a clinical level. The use of different diphosphonates seems to be more promising in reducing bone resorption in metastatic bone lesions. It is thus apparent that progress in the treatment of metastatic bone disease will need a multidisciplinary approach.

There is no evidence that the surgical treatment of bone metastases *per se* increases survival in cancer patients. It is, however, evident that reconstructive or stabilizing surgery increases the quality of life for the patients, in the sense that freedom from pain, mobility and independence are valuable goals which are obtainable even at the extreme end of life. What then are the limits of surgical activity? I have seen patients left in dreadful conditions of metastatic bone disease because of ignorance of the possibilities of surgical alleviation. But, I have also been met with propositions to treat surgically cancer patients in an almost fatal state for bone lesions, when surgery would have been an unnecessary burden to both the patient and the relatives. The crucial point is individuality, and the final decision has to be reached between the individual patient and the individual doctor. Respecting the dignity of man means that sometimes no treatment will be the best treatment.

It is thus apparent that there is a need for better and more extended communication between non-surgical specialists and orthopaedic surgeons in the care of patients with bone metastases. As the incidence of metastatic bone lesions is increasing, and as refined surgical methods of treatment are now available, more patients should be given the benefit of active surgery. It is the responsibility of the orthopaedic surgeon to inform colleagues of what can be achieved by palliative surgery and to develop a positive attitude in this branch of cancer surgery. This would stimulate the planning of clinical research in a field which is partly neglected today, and where prospective series would be of great help in giving indications for surgery. The article by Stener and co-workers in this issue is a provocative demonstration of valuable measures in the surgery of bone metastasis.

References

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