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Computer-assisted planning and patient-specific instruments for bone tumor surgery within the pelvis. Clinical preliminary experience.

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Introduction

Clear margins are one of the major prognosis factors after tumor resection of the pelvis. Clear margins range only from 25 to 88% in the literature, with a high rate of local recurrence.

Computer assisted technology has been recently proposed to surgeons to improve accuracy of bone sections.

Patient specific instrumentation based on pre operative CT and MRI planning has demonstrated its accuracy to replicate preoperatively planned bone cuts on an experimental model.

In this paper, we report our preliminary clinical experience with this technology.

Material and methods

Five patients have been operated for a malignant bone tumor of the pelvis using a patient specific instrumentation based on 3D pre operative tumor delimitation. Bone cuts were chosen by the surgeon and cutting guides positions on bone were chosen by the engineer and surgeon together.

All resection included peri acetabular zone 2, with a posterior trans-sacral cut in 2 cases and a total iliectomy in one case.

Per-operative data and macro and microscopic margins were collected prospectively.

Results

The unique position on bone that corresponds to the patient's specific instrumentation was found very easily with no doubt in 4 cases, with some doubts in one case, and within 5 minutes in all cases.

No per operative complication can be identified as to be in relation with the instrumentation.

The accuracy of the bone cuts, especially the posterior trans sacral cut or the posterior trans iliac cut, allowed a very quick and safe mobilization of the tumor after bone cuts .

In all cases margins were clear of tumor (R0).

No patient recurred.

Discussion

This new technology based on computerized preoperative planning and patient specific instrumentation is promising in terms of per operative technical aid. Our first experience in these challenging localization such as pelvic bone tumor show that we can easily find accurate bone surfaces that support the instrumentation. Moreover the accuracy of bone cuts facilitate tumor mobilization. In all the cases of this short experience, post operative margins were clear in perfect agreement with preoperative planning. A wider experience and longer follow-up is necessary to confirm these findings.

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