

Iso C 3D navigierte perkutane Knochenbiopsien. ISO C3D navigated Percutaneous Bone Biopsy.

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Introduction

The histological examination has remained indispensable for a definitely diagnosis of ambiguous bone lesions although imaging modalities for diagnostics make great strides. The removal of tissue samples for histopathological analysis percutaneous bone biopsies plays a prominent role in addition to surgical excision. CT- navigated percutaneous bone biopsies have become a generally accepted standard method for non-surgical extraction of histological and cytological material. A percutaneous bone biopsy should only be considered, if singly the histological examination could give information about dignity and diagnosis of a radiological and sczintigrafical conspicuous lesion and therapeutical consequences result from this information. In numerous studies it could be shown that almost 90% of CT-navigated percutaneous bone biopsies afford the classification of osteolytical lesions. The high level of x-ray exposure for the patient as well as the examiner is still a disadvantage as well as important CT capacities are occupied. The aim of this study was to develop a navigated sleeve for the Jamshidi nail so percutaneous bone biopsies could be taken navigated with the help of Iso-C-3D. The examination was analysed relating to precision, total operating time and level of contamination.

Methods

Navigated by Iso-C-3D, 30 percutaneous bone biopsies were taken from cadaver specimen (10 Femura, 10 Tibiae und 10 Humeri). In advance, artificial bone lesions were prepared with a mixture of methylene blue and radiopaque material. The dynamic reference base was placed at a safe distance of approximately 130 mm to the lesion. To avoid artefacts in data acquisition with the ISO-C-3D-C-bow Siremobil®. A conventional Jamshidi needle 15.3 cm x 3.1 mm was used by the surgeon. For each biopsy a separate needle connected

to a special holder including a reference, was used. The biopsy was considered to be successful when the bioptical sample contained methylene blue. To each biopsy total operating time, including the placement of the dynamic reference base, as well as radiation time was taken in consideration. The results were compared to retrospective data of CT-based bone biopsies from the last 3 years.

Results

In comparison to CT navigated biopsies Iso-C-3D navigated percutaneous bone biopsies could be taken significantly faster. By using the Iso-C-3D the total operation time could be reduced to 11.7 min [8-14.3] in relation to 40 min [30-110] by using the CT. Radiation time was at 0.3 min (Iso-C-navigated) and 1.6 (CT-navigated). In Iso-C-3D navigated biopsies 30 of 30 (100%) lesions were definitely hit by the surgeon. Concerning hit rate, information could not be worked out from the retrospective collected data.

Discussion

The CT-navigated percutaneous bone biopsy became established as a minimal-invasive standard method for the fast removal of material from non-specific bone lesions for histological examination. Within the literature an overall accuracy of 90% is declared. In the past, Computer assisted methods could lead to significant and qualitative improvements of results of surgical treatment. Since this study was designed under laboratory conditions and the patients collective was not really corresponding to the retrospective analysed patients, only an indirect comparison is possible. With this study it could be demonstrated that Iso-C-3D-navigated percutaneous bone biopsies could be gained faster and with less radiation dose. The overall accuracy was up to 100%. However the histological overall accuracy is not possible to explore in an invitro study. Therefore further experiments concerning this problem are in process. Whether or not the radiation dose and total operating time can be reduced and how exact histological overall accuracy must be evaluated in following clinical studies.