J HK Coll Radiol 2003;6:28-29

TECHNICAL NOTE

Breast Thickness and Lesion Depth Measurement Using Conventional Stereotactic Biopsy Systems

T Chan, KW Wong, KW Tsui, HY Lau, MC Au Yeung

Department of Radiology, Princess Margaret Hospital, Hong Kong

ABSTRACT

Thin breasts and shallow lesions are commonly encountered problems that preclude safe stereotactic core biopsy with a vertical approach using erect add-on stereotactic biopsy systems. A simple method to measure breast thickness and depth of lesion using conventional erect add-on stereotactic biopsy systems is outlined. A spinal needle and its needle guides are the only additional instruments required. The measurements obtained indicate the feasibility of stereotactic core biopsy, thus avoiding unnecessary puncture and facilitating planning of alternative biopsy methods.

Key Words: *Biopsy, Breast*

INTRODUCTION

Small or thin breasts present a common problem with respect to undertaking stereotactic core biopsy in the Asian population. The breast needs to be of sufficient thickness to accommodate a biopsy needle in the post-biopsy position. The minimum breast thickness required for safe core biopsy using a 100 mm Biopty needle (Bard, Covington, USA) or Magnum needle (Bard, Covington, USA) has been shown to be approximately 30 mm.[1]

In addition, the lesion to be biopsied must be at a sufficient depth from the skin surface to accommodate the whole biopsy trough of the core biopsy needle — usually no less than 14 mm, depending on skin thickness.

However, breast thickness and lesion depth measurements are not readily available on conventional stereotactic add-on erect biopsy systems as opposed to modern digital equipment. This paper outlines a simple and accurate method to obtain these 2 measurements to determine the feasibility of erect stereotactic biopsy before any incision is made.

Correspondence: *Dr T Chan, Department of Radiology, Princess Margaret Hospital, Kowloon, Hong Kong.*
Tel: (852) 2990 1340; Fax: (852) 2990 3276;
E-mail: taochan@hkcr.org

Submitted: 7 November 2002; Accepted: 9 January 2003.

TECHNIQUE

This method has been developed using a Senographe DMR mammography machine, (General Electric Medical Systems, Milwaukee, USA) with a 3-dimensional stereotactic add-on erect biopsy table, Stereotix 2 (General Electric Medical Systems, Milwaukee,USA).

A 90 mm 22 G spinal needle with 0.9 mm needle guides is used to localise the lesion under stereotactic guidance. The L-value, needle length parameter in the Stereotix 2 controller unit is accordingly set to 90.[2]

When the lesion is localised on the controller unit, the Z value on the display console represents the distance of the lesion from the tabletop along the vertical path travelling through the lesion. The needle holder is then moved in the horizontal plane to directly above the lesion, that is, ΔX and ΔY on the deviation readout unit become 0. The needle is advanced vertically until it touches the skin. The distance from the needle tip or skin surface to the lesion now equals ΔZ on the deviation readout unit. Hence the depth of the lesion is ΔZ, and the thickness of the breast along the path of puncture is $Z + \Delta Z$ (Figure 1).

DISCUSSION

Breast thickness during stereotactic biopsy does not necessarily equal thickness as measured during routine mammography, even when using the same mammography machine. This is due to the difference

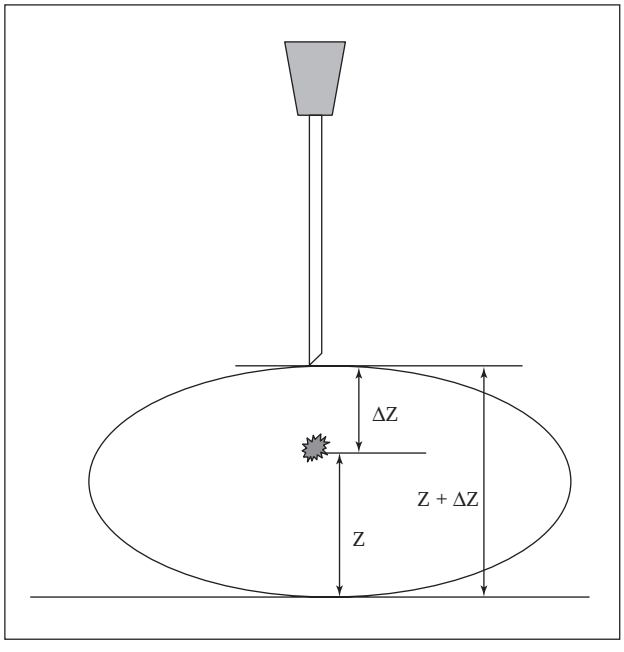

Figure 1. Schematic diagram showing the needle position and the deviation readouts when the breast thickness and lesion depth measurements are obtained.
Abbreviations: Z = distance from tabletop; ΔZ = distance from skin surface; Z + ΔZ = breast thickness at the biopsy path.

in area examined and the degree of compression involved. Therefore, accurate measurement while the breast is being compressed in the biopsy system is valuable. Direct measurement (by a caliper or ruler) of the distance between the compression plate and the table top is inaccurate, as the thickness of the compression plate itself and the bulging of breast tissue within the biopsy window are not taken into account.

Another method that we have tried involves obtaining the pairing radiographs and placing a metal marker on top of the skin surface in the biopsy window. The breast thickness can then be measured using stereotactic principles. This method is accurate and requires no additional instrumentation. However, difficulties have been experienced with this method with the marker obscuring the lesion in the pairing radiographs. Repeat radiographs were needed in this situation, leading to increases in radiation dose and examination time for the patient.

When the breast thickness is found to be insufficient for stereotactic core biopsy, manoeuvres to increase breast tissue depth may be attempted, for example, using a bolster or dam.[3] If these are not successful, alternative biopsy methods, including fine needle aspiration cytology, core biopsy by a horizontal approach, or hook-wire biopsy, should be considered. One should also consider alternative biopsy methods when the lesion is too superficial to safely undertake stereotactic core biopsy.

REFERENCES

1. Wong KW, Tsui KW, Lau HY, Yung WT, Au Yeung MC. Large needle core biopsy — avoidance of biopsy table bombardment by the biopsy needle in stereotactic guided breast biopsy. Clin Radiol 1999;54:328-330
2. General Electric Medical Systems. Stereotix 2 Operator Manual, revision 1. Milwaukee, Wisconsin: GE Medical Systems, 1994; 2:14-19.
3. Bober SE, Russell DG. Increasing breast tissue depth during stereotactic needle biopsy. AJR 2000;174:1085-1086.