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| <b>Title</b>       | <b>Is ultrasonography-guided modified coaxial core biopsy of the breast a better technique?</b> |
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# Is ultrasonography-guided modified coaxial core biopsy of the breast a better technique?

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**Objective** To compare the diagnostic rate, patient comfort, and complications of ultrasonography-guided breast biopsy using a modified coaxial technique with ultrasonography-guided fine needle aspiration and traditional core biopsy. A secondary objective was to describe the use of the coaxial technique for the biopsy of breast lesions and our initial experience.

**Design** Retrospective study.

**Setting** A regional hospital in Hong Kong.

**Patients** Patients, who were referred for ultrasonography-guided fine needle aspiration or biopsy from 23 November 2007 to 19 March 2008, were divided into three groups. For breast lesions of 8 mm or smaller, fine needle aspirations were performed. For breast lesions larger than 8 mm, the patients were randomly divided into groups receiving traditional core biopsies and coaxial biopsies. The pathological reports were reviewed.

**Main outcome measures** Diagnostic rate, patient comfort assessed in terms of pain, and any procedural complications.

**Results** A total of 45 ultrasonography-guided fine needle aspirations or biopsies of breast lesions were performed. All core biopsies using the traditional core technique (n=15) and coaxial technique (n=16) were diagnostic. While for fine needle aspirations, three (21%) of 14 were not diagnostic and repeat biopsies were undertaken for the corresponding patients. Except for one breast lesion biopsied with the coaxial technique that revealed invasive ductal carcinoma, all others yielded benign lesions. The average pain score for coaxial biopsies was 2.2, while for traditional core biopsies and fine needle aspirations, average scores were 3.7 and 3.8, respectively (P=0.022). No procedure-related complication was documented with either of the three techniques.

**Conclusion** Modified coaxial core biopsy of the breast has an optimal diagnostic rate and hence avoids the need for repeat biopsies. It is associated with better patient comfort and no increase in the risk of complications.

## Introduction

**Key words**  
Biopsy, fine-needle; Breast neoplasms;  
Pain measurement; Ultrasonography,  
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Ultrasonography (USG)-guided fine needle aspiration (FNA) and biopsy to characterise breast lesions are very common in our daily practice. Regarding different biopsy procedures, FNA and core biopsies are frequently performed, whereas USG-guided mammotome biopsy and excisional biopsy are less frequently utilised.

Coaxial core biopsy of breast lesions is gaining popularity.<sup>1</sup> It is not only used with USG guidance, but other methods are also being developed to perform it under stereotactic guidance with magnetic resonance imaging.<sup>2</sup> However we do not have local data supporting the utilisation of this biopsy technique in Hong Kong. In order to overcome this information deficiency about modified coaxial biopsy in local hospitals, we conducted a retrospective study. Our objective was to compare the diagnostic rate, degree of patient comfort, and the rate of procedure-related complications encountered with the traditional core biopsy, the modified coaxial core biopsy, and FNA under USG guidance.

## Methods

From 23 November 2007 to 19 March 2008, patients referred for USG-guided breast FNA

or biopsy were reviewed. Those having a repeat procedure due to prior failure to obtain a pathological diagnosis were excluded. The remainder were divided into three groups. For lesions of 8 mm or smaller, FNAs were performed. For breast lesions larger than 8 mm, patients underwent either traditional core biopsies or coaxial biopsies.

All procedures were performed with local anaesthesia (3-4 mL 2% lignocaine) injected at the point of needle entry or incision site. For FNA, a 21-gauge (21G) hypodermic needle was used, while for traditional core biopsy a 14G needle with a biopsy gun was utilised. For modified coaxial biopsies, a 13G coaxial needle was inserted to the near edge of the lesion under USG guidance. A 14G biopsy needle was inserted into the coaxial needle which was then pulled back for 5 mm to enable firing of the biopsy needle. Repeat biopsies were performed 3 to 5 times.

The number of passes or the number of specimens obtained was based on the judgement of the radiologist (a specialist in breast biopsy and imaging with more than 10 years' experience), and ranged from 3 to 5 until the sampling was regarded as adequate. Patients were routinely asked to assign a pain score (0: no pain, 10: most severe pain) for the entire procedure. Any immediate complication was documented in the radiology report. Patients were also asked to self-monitor their wounds for 3 days and report to our department nurse immediately, lest any delayed complication such as bleeding was observed. Corresponding information was also reviewed for any casualty or out-patient attendance by resorting to the Electronic Patients Record. Pathology reports were also reviewed to assess the final diagnosis and the diagnostic rate.

## Results

A total of 45 patients were recruited. Their ages ranged from 27 to 70 years with a mean of 48 years. No statistical difference was noted in the mean age of all three groups (Table). The total number of cases having FNAs, traditional core biopsies, and modified coaxial biopsies were 14, 15 and 16, respectively.

All core biopsies using the traditional core technique (n=15) and modified coaxial technique (n=16) rendered a final diagnosis, while for FNAs, three (21%) of 14 were not diagnostic and repeat biopsies were performed for the corresponding patients. Except for one breast biopsy (by the coaxial technique) that showed an invasive ductal carcinoma, all the other lesions turned out to be benign.

Significant reduction in pain was observed for coaxial biopsies, for which the average pain score was 2.2. For traditional core biopsies and FNAs, the average pain scores were 3.7 and 3.8, respectively. The differences between coaxial biopsy and traditional

## 超聲波導引改良同軸穿刺乳腺活檢技術是否更好？

**目的** 比較超聲波導引改良同軸穿刺乳腺活檢、超聲波導引細針穿刺及傳統穿刺活檢三種技術，於診斷率、病人舒適度及併發率的分別，並描述使用同軸穿刺乳腺活檢術的經驗。

**設計** 回顧研究。

**安排** 香港一所地區醫院。

**患者** 2007年11月23日至2008年3月19日期間，被轉介作超聲波導引乳腺細針穿刺術或傳統乳腺活檢術的病人共分為3組。乳腺腫瘤為8 mm或以下的病人接受細針穿刺術；8 mm或以上的病人則被隨機分配至傳統穿刺活檢術及同軸穿刺活檢術兩組。最後回顧病人的病理報告。

**主要結果測量** 診斷率、用疼痛指數作指標的病人舒適度，以及與手術有關的併發症。

**結果** 回顧45位病人的病理報告，所有接受傳統穿刺活檢術 (n=15) 及同軸穿刺活檢術 (n=16) 的病人皆得到確診。14位接受細針穿刺術的病人中，3位 (21%) 未能確診，須重複進行活檢。除了1位接受同軸穿刺活檢的病人被發現有乳腺浸潤性導管癌，其餘病人只有良性腫瘤。疼痛指數方面，同軸穿刺活檢平均為2.2、傳統穿刺活檢3.7、細針穿刺3.8 (P=0.022)。三種技術都沒有出現與手術有關的併發症。

**結論** 使用改良同軸穿刺乳腺活檢術有令人滿意的診斷率，也可避免重複活檢，提高病人的舒適度，亦未有增加併發症的風險。

TABLE. Patient age, diagnostic rate of different procedures, and pain scores\*

| Procedure      | Mean age (SD) | Diagnostic rate (%) | Mean pain score (SD)   |
|----------------|---------------|---------------------|------------------------|
| FNA            | 47 (10)       | 79                  | 3.8 (1.9)              |
| Core biopsy    | 50 (11)       | 100                 | 3.7 (2.3) <sup>†</sup> |
| Coaxial biopsy | 47 (11)       | 100                 | 2.2 (1.1) <sup>†</sup> |

\* FNA denotes fine needle aspiration, and SD standard deviation

<sup>†</sup> P=0.022

core biopsy/FNA pain scores were statistically significant (P=0.022) [Table]. No procedure-related immediate or delayed complication was documented with either of the three techniques.

## Discussion

Biopsy of breast lesions using the modified coaxial technique is gaining popularity as it is time-saving and less traumatic to patients, and at the same time its diagnostic accuracy is not compromised.<sup>3</sup> This was also revealed in our study, which showed an optimal diagnostic rate, thus avoiding the need for repeat biopsy. It was also associated with better patient

comfort and no increase in complications.

In our study, there was no statistically significant difference in age among the three groups, and all the procedures were undertaken by a single experienced breast radiologist. Thus, patient age and operator-dependent factors were unlikely to have been confounding factors. Ultrasonography-guided FNA yielded the lowest diagnostic rate, which could be accounted for by the smaller lesion sizes. However, it also yielded the highest mean pain score, which we inferred was due to the technique and not the lesion size.

Generally three to four biopsy specimens would be needed to consider sampling as adequate.<sup>4</sup> Modified coaxial biopsy could obtain multiple specimens in one pass, which meant that trauma to the breast was minimised, and presumably accounted for pain alleviation. Also the track from the skin to the lesion could be maintained by the coaxial needle making biopsy needle passage through the breast much easier. Despite the use of a smaller-bore hypodermic needle, FNA is more painful, due to the to-and-fro action exerted through the skin and the lesion during each pass.

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Our study was of small scale in terms of sample size and therefore its statistical power was limited. Moreover, the lack of information on patient background characteristics and lack of randomisation could be confounding factors. We, however, did use objective criteria for the diagnostic rate assessment and the fact that a single operator performed all procedures reduced the possibility of investigator bias. Also, as the patients were blinded to the core biopsy procedures, there was no recall bias. Based on our findings, and together with study results from other parts of the world, we advocate a larger-scale randomised control trial to evaluate these breast biopsy techniques.

## Conclusion

Modified coaxial technique under USG guidance is not widely utilised in Hong Kong. Given the above-mentioned advantages, it could be considered for adoption into department or individual protocols, as multiple specimens can be obtained via one skin passage, and the diagnostic rate is as good as traditional core biopsy.