



Modified Core Wash Cytology: A reliable same day biopsy result for breast clinics

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Abstract

Background: Fine Needle Aspiration Biopsy (FNAB), Core Needle biopsy (CNB) and hybrid techniques including Core Wash Cytology (CWC) are available for same-day diagnosis in breast lesions. In CWC a washing of the biopsy core is processed for a provisional cytological diagnosis, after which the core is processed like a regular CNB. This study focuses on the reliability of CWC in daily practice.

Methods: All consecutive CWC procedures performed in a referral breast centre between May 2009 and May 2012 were reviewed, correlating CWC results with the CNB result, definitive diagnosis after surgical resection and/or follow-up. Symptomatic as well as screen-detected lesions, undergoing CNB were included.

Results: 1253 CWC procedures were performed. Definitive histology showed 849 (68%) malignant and 404 (32%) benign lesions. 80% of CWC procedures yielded a conclusive diagnosis: this percentage was higher amongst malignant lesions and lower for benign lesions: 89% and 62% respectively. Sensitivity and specificity of a conclusive CWC result were respectively 98.3% and 90.4%. The eventual incidence of malignancy in the cytological 'atypical' group (5%) was similar to the cytological 'benign' group (6%).

Conclusion: CWC can be used to make a reliable provisional diagnosis of breast lesions within the hour. The high probability of conclusive results in malignant lesions makes CWC well suited for high risk populations.

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Keywords: Breast neoplasms; Diagnosis; Biopsy; Cytological techniques

Introduction

In the United States, 222,175 women were diagnosed with breast cancer in 2011.¹ Although National Comprehensive Cancer Network (NCCN) guidelines make no mention of the preferred duration of diagnostic workup,² European guidelines encourage rapid confirmation or exclusion of cancer within 24–48 h.³ Especially patients with benign disease benefit from reduced duration of

anxiety,⁴ in malignant cases a quick confirmation expedites subsequent treatment. To meet this challenge, different approaches have been developed.

Fine Needle Aspiration Biopsy (FNAB) allows a diagnosis within an hour, with sensitivity of 35–95%, specificity of 48–100% and conclusivity of 60–75%.⁵ This has progressively led most clinics to adopt Core Needle Biopsy (CNB) as diagnostic tool of choice.^{5–9} Considered as the gold standard for evaluating solid breast lesions,^{5–9} CNB often requires more processing time. Recently, the accelerated CNB processing method has demonstrated a reliable histological diagnosis on the

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day of biopsy.¹⁰ However, alternative techniques are also available.

In an attempt to combine speed and accuracy a hybrid technique, Core Wash Cytology (CWC) of a CNB specimen (CNB + CWC), combining cytology and histology, was developed. The CNB specimen and needle are ‘washed’ in a saline solution or special fixative which is then cytocentrifugated and pressed onto a slide (Fig. 1). The resulting cytology specimen is interpreted using the same guidelines as used for FNAB.¹¹ Afterwards the Core itself provides a histological diagnosis. After an initial promising study,¹² a second larger series¹³ found the technique performed poorly, with a low specificity (72%) and an unacceptably high inconclusive rate (42%).

Following a successful pre-clinical pilot study,¹⁴ our breast clinic adopted a modified CWC technique for the evaluation of solid breast lesions. A review of this technique describing 229 patients showed excellent results with a sensitivity of 97%, a specificity of 100% and an inconclusive rate of 4%.¹⁵ To our knowledge, no series validating or evaluating CWC in breast cancer have been published since.

The aim of the present study was to relate the previous pilot results to a larger consecutive daily practice series of patients diagnosed using standardized CNB + CWC in a regional breast clinic over a 3 year period.

Materials

Patient selection, database

The prospectively filled National Pathology Database of the Netherlands (PALGA¹⁶) was searched to identify all CNB procedures of the breast in our clinic, between May 1, 2009 and May 31, 2012, including both symptomatic and screen detected lesions. All patients with CWC following CNB were included. We analysed baseline patient characteristics including age, referral indication and ‘Breast imaging- reporting and data system’ (BI-

RADS)¹⁷ classification. CWC- and CNB result, as well as information on hormone receptor- and HER2 status were recorded. Furthermore, we included post-operative pathology results and neo-adjuvant therapy in our database.

Biopsies

CNB was performed using US-, stereotactic- or MRI guidance. US-guided biopsies were performed using an 18 gauge needle on a BARD® MAGNUM® biopsy gun. The number of cores for each biopsy was at the discretion of the radiologist. Stereotactic and MRI guided biopsies were performed with a Vacuum Assisted Biopsy (VAB) system. VAB specimens were not processed using the CWC procedure, and were excluded from this study.

CWC technique

Technical details of the modified CWC procedure have been described in previous reports.^{14,15} In short: after biopsy the CNB specimen is placed in a transport solution (initially Roswell Park Memorial Institute (RPMI), later replaced with a 50% ethanol/2% polyethylene glycol solution). After removing the CNB specimen for regular processing, cells remaining in the medium are cytocentrifugated, processed to a monolayer slide and stained according to Papanicolaou.

Pathology

The CWC specimen is interpreted within one hour following biopsy, using the same criteria as for FNAB. According to international guidelines,¹¹ findings are categorized as ‘insufficient material’ (inconclusive), ‘benign’, ‘atypical favouring benign’, ‘atypical’ (inconclusive), ‘suspicious for malignancy’ or ‘malignant’. CNB specimens were processed and reported on according to the Dutch national breast cancer guidelines.¹⁸ The report includes both

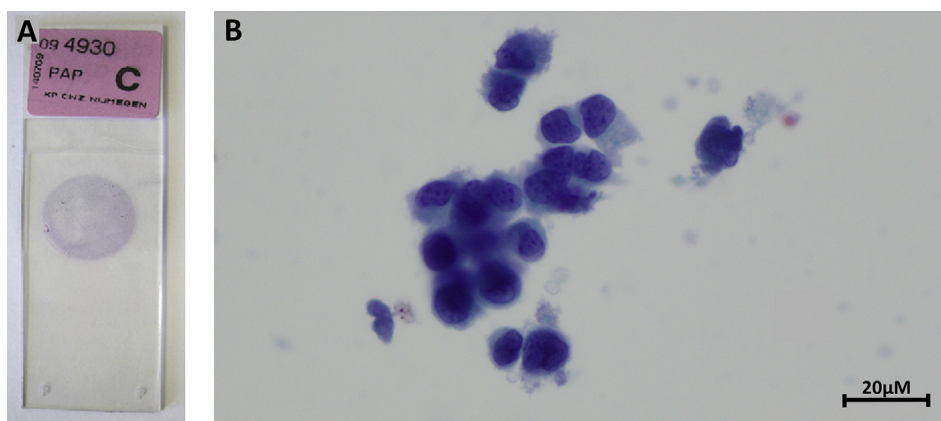


Figure 1. Core Wash Cytology. Resulting macroscopy of a Core Wash slide (A). Resulting microscopy of a Core Wash slide. Malignant epithelial cells with large nucleoli. Pap staining, magnification 400× (B).

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