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# Indicators of breast cancer in patients undergoing microdochectomy for a pathological nipple discharge in a middle-income country

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## ABSTRACT

**Background:** The management of a pathological nipple discharge often involves surgery for the exclusion of a malignant etiology. This study aimed to determine the prevalence of cancer in patients who had microdochectomy for pathological nipple discharge in a population in South Africa and to evaluate patients' demographics and clinical characteristics as indicators of underlying cancer and make recommendations for their management in resource-limited settings.

**Materials and methods:** Clinical, radiological, and histological data from 153 patients who underwent a microdochectomy for a pathological nipple discharge at two South African breast clinics was collected.

**Results:** Invasive or *in situ* cancer was found in 12 patients (7.84%), and in all patients, cancer was associated with a bloody nipple discharge. Bloody discharge had a sensitivity of 100% in indicating cancer, specificity of 55.32%, positive predictive value of 16%, and negative predictive value of 100%. Patients with breast cancer were also more likely to be aged 55 y or older ( $P = 0.04$ ). Preoperative mammogram and ultrasound were poor in detecting cancer (0/12).

**Conclusions:** In our population, a bloody discharge in women aged 55 years or older should mandate a microdochectomy, with selective surgery for younger women and those with nonbloody discharges. Thorough clinical examination to determine the true color and nature of the discharge is vital in the initial assessment of these patients. Preoperative radiology is not helpful in determining the presence of cancer (in an isolated pathological nipple discharge), and microdochectomy still remains the gold standard in diagnosing cancer in these patients.

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## Introduction

The management of a pathological nipple discharge can be challenging for the treating physician, ensuring timeous diagnosis of any underlying cause, but avoiding unnecessary surgical intervention. Nipple discharge is the third most common cause for women presenting with breast complaints,<sup>1</sup> and breast cancer can be the cause in up to 37%,<sup>2</sup> occurring most commonly in patients with a concurrent breast mass. In the largest meta-analysis involving 3110 patients with a nipple discharge, 18.7% had cancer as a cause.<sup>1</sup>

Nipple discharges can be separated into physiological or pathological. A physiological nipple discharge is often seen following breast manipulation, it is typically bilateral and emanates from multiple ducts. Its causes are mainly benign.<sup>3</sup> By contrast, a pathological nipple discharge is defined by the presence of one or more of the following: spontaneous nipple discharge, bloody nipple discharge, and/or nipple discharge associated with a mass or skin changes.<sup>4</sup> It is usually unilateral, uniductal, and often persistent. A detailed patient history and examination can help separate the two types of nipple discharges.

Most studies have shown an association between a bloody discharge and cancer,<sup>5-7</sup> with old age also suggested as a predictor for malignant disease.<sup>8,9</sup> A study done in Ghana, with a comparable population to our own, showed cancer as a cause in 2.5% of patients with a bloody nipple discharge without palpable masses, increasing to 31.7% when those with palpable masses were included.<sup>10</sup>

In the absence of a mass or focus for core needle biopsy, microdochestomy remains the gold standard to exclude malignancy in patients with a pathological nipple discharge. This surgical procedure, carried out under general anesthetic, entails making a limited circumareolar incision and excising the discharging duct. A lacrimal probe or methylene blue dye can be used to help locate and follow the duct during dissection.<sup>11</sup> Compared to complete subareolar tissue excision and mastectomy, which were done in the past to exclude malignancy, microdochestomy is less invasive, and also preserves ducts for future breast feeding in women of reproductive age.<sup>11</sup>

In an attempt to avoid unnecessary operative procedures (including a microdochestomy), nonoperative measures have been investigated for their predictive value for cancer. These include nipple discharge cytology including testing for occult blood, ductography, ductoscopy, as well as preoperative radiology such as ultrasound, mammogram, and magnetic resonance imaging (MRI)<sup>12-14</sup>; however, few have been shown separately to have a high sensitivity for predicting cancer.<sup>4,14</sup> In one study, mammogram, ultrasound, MRI, and ductography had a sensitivity of 37.5%, 25.5%, 100%, 50.0% respectively in diagnosing malignancy.<sup>14</sup>

In Sub-Saharan Africa, the implications of a surgical procedure and hospital admission will affect every domain of a patient's life. Patients require time off from scarce work, travel back and forth to a hospital capable of the procedure for initial and follow-up visits (which may be more than 100 km away), as well as the high costs associated with an operation. These factors reiterate the importance that each operation should be justifiable or unavoidable. It is vital to

find preoperative investigations or clinical parameters that can be associated with cancer in our patients. The purpose of this study was to evaluate the characteristics, which may help predict cancer in patients with a pathological nipple discharge and to potentially make recommendations on how to best approach these patients in a resource-limited setting.

## Materials and methods

### Patient selection

This was a retrospective records review of female patients undergoing microdochestomy for pathological nipple discharge at two specialist breast care centres in Johannesburg, South Africa, over a 5 year period (June 2007 to June 2012). Ethical approval for the study was obtained from the University of the Witwatersrand Human Research Ethics Committee (Medical) (clearance number M120974).

### Setting

These two centers are situated in Johannesburg, South Africa, which is an upper-middle-income country and the primary economic hub for Southern and South Africa. This dual centre study included patients with medical insurance seen in a private hospital, and those without medical insurance seen in a public hospital. The same clinicians in the study managed patients in both facilities. The public health system in South Africa covers 87% of the population and operates with limited resources, both in workforce and infrastructure. Although the public hospital in this study is a specialist breast unit with a comprehensive range of imaging and diagnostic facilities, this study was planned to assist in informing and directing care in similar resource settings where specialist workforce are less available. It remains relevant in any area where the global impact of admission and surgery affects many domains of the patient's functioning.

### Data acquisition

Patients who underwent microdochestomy were identified from theater records. Demographic data was captured from hospital records, and clinical consultation notes indicated the characteristics of the nipple discharge. Preoperative clinical and radiological records were reviewed in addition to patients' final histologic reports. Patients with a known history of breast malignancy, palpable mass, or any other features that suggested malignancy on clinical examination were excluded from the study, as were patients with physiological nipple discharges. These patients were managed according to unit protocols, with suspicious lesions undergoing core needle biopsy (and managed according to biopsy findings), whereas those with physiological nipple discharge were followed up and the cause of the discharge treated, if identified.

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