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Underestimation of cancer in case of diagnosis of atypical ductal hyperplasia (ADH) by vacuum assisted core needle biopsy

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ABSTRACT

Background: With the introduction of mammography screening, we are more often dealing with the diagnosis of precancerous and preinvasive breast lesions. An increasing number of patients are observed to show a premalignant change of ADH (atypical ductal hyperplasia). It also involves a wider use of the vacuum assisted core biopsy as a tool for verifying nonpalpable changes identified by mammography.

Aim: This paper describes our experience of 134 cases of ADH diagnosed at Mammotome® vacuum core needle biopsy.

Material and methods: Of 4326 mammotomic biopsies performed at our institution in 2000–2006, ADH was diagnosed in 134 patients (3.1%). Patients underwent surgery to remove the suspected lesion. All histopathological blocks were again reviewed by one pathologist. Clinical, radiological and pathological data were collected for statistical evaluation.

Results: Underestimation of invasive changes occurred in 12 patients (9%). The only clinicopathologic feature of statistical significance radiologically and pathologically was the presence of radial scar in the mammography.

Conclusions: More frequent diagnosis of precancerous changes in the mammotomic breast biopsy forces us to establish a clear clinical practice. The problem is the underestimation of invasive changes. The occurrence of radial scar on mammography for diagnosis of the presence of ADH increases the risk of invasive changes.

1. Background

Atypical ductal hyperplasia (ADH) is a premalignant change in the breast. This change is detected when at least two lines or areas connected with the ducts are present by atypical cell changes, or if the area occupied by atypical cells is less than two millimeters. Otherwise, we speak of DCIS (ductal carcinoma in situ). It follows that the difference between ADH and DCIS is minor, especially in the case of excision by core

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biopsy when we cannot visualize the entire area of a suspicious change. This implies a great difficulty in putting the final diagnosis. Atypical ductal hyperplasia (ADH) of the breast was first described by Page in 1985 as an amendment to the border between the ductal hyperplasia and ductal cancer in situ (DCIS).[1] Therefore, more and more suspicious nonpalpable changes of the breast discovered mammographically, increased the frequency of mammotomic biopsies performed. It has revolutionized the detection of early forms of breast cancer. Thus, screening mammography and mammotomic biopsy has contributed to the increased frequency of detection of ADH. Nevertheless, mammotomic biopsy has its drawbacks associated with the underestimation of invasive change in the final histological diagnosis.

In the case of diagnosis of ADH by core biopsy, it is necessary to widen the resection of the change to the final pathologic examination. Known issue of underestimation of lesions in the case of primary invasive diagnosis of ADH applies up to 88% of cases when using 14G needles and is reduced to a few percent if vacuum core needle biopsy is used.[2–8] With ADH diagnosed, the risk of breast cancer increases 4–5 times. This risk is doubled if we are dealing with a positive family history of breast cancer.[9] Collins et al. investigated a group of women undergoing core biopsy in the Nurses' Health Study, with atypical hyperplasia as the most advanced change.[10] The women with atypia (ADH and ALH (atypical lobular hyperplasia)) were older, less frequently premenopausal and nulliparous, compared with the control group. Women with ADH drank slightly more alcohol, were more likely to have undergone bilateral resection of the ovaries and a greater proportion of applied hormone replacement therapy for longer than 5 years. In the Mayo Cohort Study, women with atypia (ADH and ALH) showed a very high risk of developing breast cancer (risk >50% over 20 years) in the event of multiple foci of histologically found atypia and the presence of microcalcifications.[11] In this group of patients, family history of breast cancer had no effect on increasing breast cancer risk.

In the model of cancer cell lines from normal glandular breast to invasive cancer have several stages until the preinvasive and invasive cancer.[12] In the case of growth of normal cells, we are talking about usual ductal hyperplasia (UDH). In the case of accumulation of irregularities within the cell nucleus, we can talk about the acquisition and the characteristics of atypical histology that can be observed in flat epithelial atypia (FEA). A continued proliferation of this change is the next stage of ADH. Then we have to deal with cancer, only that it is separated from the basal membrane of normal cells and thus qualified as DCIS. In the case of tumor cell invasion through the basement membrane of DCIS initially taking with microinvasive and then to invasive breast cancer.

2. Aim

The aim is to evaluate the underestimation of the preinvasive and invasive changes after an initial diagnosis of ADH using mammotomic vacuum core needle biopsy.

3. Materials and methods

We analyzed retrospectively 134 patients with a primary diagnosis of ADH on the basis of Mammotome 11 G vacuum assisted core needle biopsy.

A biopsy was performed in the outpatient mammotomic unit at the Department of Surgical Oncology and General Surgery I, Greater Poland Cancer Centre. For six and a half years, 4326 biopsies have been performed. Biopsies were done in patients with nonpalpable breast changes seen in mammography. Patients who had undergone ultrasound guided biopsy were excluded from this study. Mammotomic biopsy was performed on the table, where patients were turned to face downwards (Fisher Imaging, Denver, CO, USA) using an 11 G directional vacuum assisted biopsy system (Mammotome; Biopsy/Ethicon Endo-Surgery, Cinncinatti, Ohio). We obtained an average of 12 cores (from 7 to 30). In case of ADH, all patients were admitted for surgical resection of the breast area where ADH was found. For all cases, images and descriptions of mammography, or ultrasound data were collected for review. The medical histories were re-examined and verified in terms of clinical data such as age, data on the patient's oncological history, family burden, mammographic presentation, concomitant benign lesions of the breast, type of operation. The size of the breast change was not identified. All pathological slides were again reviewed by one pathologist (PK).

Collected clinical parameters, as well as radiological and pathological findings were statistically analyzed to determine differences in study groups or the relationship between the measured traits.

All tests were analyzed at the significance level $\alpha = 0.05$. For statistical analysis statistical package Statistica 8.0 (StatSoft Inc.) was used.

4. Results

Underestimation of invasive changes occurred in 12 patients (9%). Age of patients diagnosed with ADH without cancer in final pathology was 55.6 and for patients with underestimation of cancer 60.7. When dividing patients into 2 groups (less or equal to 60 years and more than 60 years), no significant difference in ADH proportions was observed. But analyzing groups with and without underestimation, a significance was observed $p = 0.0349$. Patients with underestimation were on average older than those without underestimation.

There was a significant difference in the frequency of different diagnoses, mammography, depending on final changes to non-invasive diagnosis and under-invasive changes ($p = 0.0001$).

Radial scar is more common in the evolution of invasive breast screening and other diagnoses (microcalcifications, macrocalcifications, mass and density) are more characteristic for non-invasive change (Table 1).

Among patients diagnosed with ADH on the basis of Mammotome biopsy, there were no statistically significant differences in the incidence of various histopathological factors in breast glands, depending on the invasiveness of the change. We analyzed such changes as the CCC (columnare