

The stereotactic mammotomic biopsy system (SMBS) in the diagnosis of non-palpable lesions of the mammary gland

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Aim. The paper presents the authors' observations concerning the Stereotactic Mammotomic Biopsy System (SMBS) in the diagnosis of non-palpable lesions of the mammary gland.

Method. The SMBS is a minimally invasive technique of obtaining tissue samples from mammographically-detectable breast lesions for histological verification. The procedure is carried out under local anaesthesia.

Material and results. Between April 2000 and February 2001 563 biopsy procedures were carried out. The lesions investigated by biopsy were classified according to the mammograms into three groups: micro-calcifications (51%), radial scars (7%) and tumour X (42%). A detailed analysis of the histological data was performed in these groups. In approx. 15% of patients breast carcinoma was diagnosed and they were referred for surgical treatment. In the rest of the patients (85%) the lesions proved to be benign.

Conclusions. The SMBS is a method of choice in the diagnosis of non-palpable breast lesions.

Wykorzystanie Systemu Stereotaktycznej Biopsji Mammotomicznej (SSBM) w diagnostyce niewyczuwalnych zmian gruczołu piersiowego

Cel pracy. W pracy przedstawiono własne doświadczenia w diagnostyce niewyczuwalnych zmian gruczołu piersiowego z wykorzystaniem Systemu Stereotaktycznej Biopsji Mammotomicznej (SSBM).

Metoda. Biopsja mammotomiczna jest miniinwazyjną metodą, pozwalającą na celowane pobranie materiału tkankowego ze zmiany w piersi, widocznej w obrazie mammograficznym, a wymagającej weryfikacji histopatologicznej. Zabieg przeprowadza się ambulatoryjnie, w znieczuleniu miejscowym.

Materiał i wyniki. W Oddziale Chirurgii I w okresie od kwietnia 2000 roku do lutego 2001 roku wykonano 563 zabiegi w SSBM. Zmiany poddane biopsji podzielono na 3 grupy: microcalcificationes (51%), radial scar (7%), tumor x (42%). Szczegółowej analizie poddano rozkład wyników histopatologicznych w poszczególnych grupach. U 15% pacjentek rozpoznano raka piersi i zakwalifikowano do leczenia operacyjnego. U pozostałych 85% zmiany okazały się łagodne, a pacjentki uniknęły zabiegu operacyjnego.

Wnioski. Stereotaktyczna Biopsja Mammotomiczna w naszej ocenie jest metodą z wyboru w diagnostyce niewyczuwalnych zmian gruczołu piersiowego.

Key words: breast cancer diagnosis, non-palpable lesions, mammatome, stereotactic breast biopsy

Słowa kluczowe: diagnostyka, rak piersi, niewyczuwalne zmiany, mammotom, stereotaktyczna biopsja

Introduction

In Poland the morbidity rate of women with breast cancer, the most prevalent malignancy among the female population, constitutes 18.4%. Breast cancer is also the primary cause of mortality due to cancer (14.1% of all deaths) [1]. In order to improve the results of therapy an educational campaign has been successfully carried out to popularize preventive mammographic examinations. The growth in patients' awareness of the hazards posed by breast cancer in women and easier access to mammogra-

phy have resulted in better diagnosis of non-palpable lesions that require histological verification. Until now biopsy procedures were performed under general anaesthesia as open biopsies [2-5].

Method

Mammotomic biopsy is indicated in patients, who present with mammographically detected, non-palpable breast lesions requiring histological verification. The lesion must be of a focal nature (i.e. a cluster of microcalcifications, a radial scar, or a solid nodule) visible in two mammographic projections.

Using the Stereotactic Mammotomic Biopsy System the procedure does not require any preliminary preparation and can be carried out under local anaesthesia on an out-patient basis. The patient is positioned prone on a stereotactic Fi-

sher's table. The examined breast hangs down in the table window. The localisation of the lesion is estimated on the basis of current mammograms, and the breast is pressed with a 5cmx5cm pressure plate so that the examined lesion is positioned in the centre of the window.

A radiogramme is made in a 0° projection and one assures that the lesion is visible on the computer monitor screen. Otherwise the positioning must be repeated. When the lesion is clearly seen on the monitor, radiogram are made in two other projections, i.e. (+)15° and (-)15°. The picture on the screen represents the lesion in a 300 projection. Using the cursor one marks the point appearing on the projections. One must be sure that the same element in the lesion is marked in both projections to assure that the proper sample is obtained during the biopsy.

Further procedures leading to the biopsy "target" are carried out by a computer programme. The target parameters are shown on the monitor in the form of horizontal, vertical and depth coordinates. The horizontal and vertical coordinates are automatically fed into the device, which directs the biopsy needle to the previously determined target area. According to the computer data the surgeon marks the depth at which the needle is inserted into the immobilised breast on a guide bar.

The next step involves the invasive procedure. The part of the breast visible in the window of the pressing plate is treated with an antiseptic. The site of the biopsy needle insertion is anaesthetized with 1% solution of lignocaine with adrenaline, and a 3-5 mm skin incision is made. The biopsy needle is inserted into the breast to the depth indicated on the guide bar. Thus the point of the needle is in contact with the "target". After releasing the safety catch, the trigger is also released and the needle is "fired" so that its biopsy chamber enters the lesion. The specimen is obtained by aspiration in the form of 10-20 tissue casts (30-100 mg of tissue). After completing the biopsy procedure a radiogram is made of the site and the extent of the excision is determined. The biopsy site can be marked with a metal clip, or either anatomical features (eg. micro-calcifications) may provide some indication in order to monitor subsequent changes within the lesion. The entire procedure can be registered on radiogram either on the hard disk or on CDs. Before the needle is removed the wound is carefully aspirated.

After the procedure the patient is placed prone and the site of the incision is pressed through sterile gauze for 10 minutes. Next the wound is closed with a steri-strip and pressure dressing is applied for 24 hours [3]. After a week's follow-up the patient is informed about the results of the histological examination and suitable recommendations are issued.

If malignant or pre-cancerous conditions are diagnosed the patient is referred for further treatment. If the lesion is pronounced benign, mammography is recommended after a period of 6 months.

Material and results

Between April 2000 and February 2001 (11 months), 563 biopsy procedures were carried out in women aged between 39-80 years (mean age – 55 years) using the SMBS technique at the Mammotomic Biopsy Unit of the Surgery Department I, Great Poland Centre of Oncology in Poznan. The investigated lesions were more often localized in the left breast (308 cases, ie 54%) than in the right breast (255 cases, ie 45.2%).

The distribution of lesions in the separate parts of the breast was as follows: external upper quadrant (261 cases, ie 46.4%), internal upper quadrant (99 cases, ie 17.5%), external lower quadrant (46 cases, ie 8.2%), internal-lower quadrant (41 cases, ie 7.2%), part outside the nipple (75 cases, ie 13.4%), and two so-called difficult localisations: lesions close to chest wall (29 cases, ie 5.2%), and lesions in the Spence's tail (12 cases, ie 2.1%).

According to the mammograms the lesions investigated by biopsy were classified into three groups:

Micro-calcifications	239 cases (42.4%)
Tumours	286 cases (50.8%)
Radial scars	38 cases (6.8%)

The lesions in the three groups were classified according to histological data:

Micro-calcifications:	
Fibrous and cystic mastopathy	77 cases (32.2%)
Adenosis	38 cases (15.9%)
Epitheloplasia	38 cases (15.9%)
Papillomatosis	5 cases (2.1%)
Fibroadenoma	24 cases (10.1%)
Lipomatosis	19 cases (7.9%)
Carcinoma	38 cases (15.9%)

Tumours:	
Fibrous and cystic mastopathy	67 cases (23.4%)
Adenosis	52 cases (18.2%)
Epitheloplasia	24 cases (8.4%)
Fibroadenoma	76 cases (26.6%)
Lipomatosis	24 cases (8.4%)
Carcinoma	43 cases (15.0%)

A total of 86 patients (15.3%) were found to have breast cancer: ductal carcinoma in situ (34 cases, ie 39.5%), invasive ductal carcinoma (29 cases, ie 33.7%), lobular carcinoma in situ (5 cases, ie 5.8%), invasive lobular carcinoma (9 cases, ie 10.5%), and tubular carcinoma (9 cases, ie 10.5%).

As few as 15% of all patients required surgical treatment after mammotomic biopsy. Surgery was indicated on the basis of cancerous or precancerous conditions (eg atypical epithelioplasia) diagnosed histologically. Therefore surgery was undertaken basing on preliminary information as to the histological type of the cancer, its degree of malignancy, infiltration, etc, allowing for rational planning of the procedure (standard radical mastectomy, simple mastectomy with axillary lymph node dissection, sparing treatment – BCT, etc).

None of the 563 patients who had undergone mammotomic biopsy had suffered any complications in the course of, and after surgery. The only effect brought on by this minimally invasive procedure was a hardly perceptible scar a few millimeters long.

Discussion

The increase in the number of mammographically detectable, non-palpable breast lesions brought on the development of a new method of sampling tissue material for histological verification. The traditional surgical removal of lesions on the basis of tentative localization on mammograms, or using a J-needle for marking the lesion, involved unnecessary excision of a large volume of breast tissue, exposed the patient to general anaesthesia and caused the necessity of in-patient care.

The adoption of the Stereotactic Mammotomic Biopsy System (SMBS) helped to eliminate the above inconveniences. The examination involves obtaining a small specimen from the lesion to be verified. That is why this minimally invasive procedure requires only local anaesthesia, and the patient does not need to be hospitalized [2, 4]. On the basis of our data it is clear that due to the

SMBS some 85% of all patients have been spared surgery with its adverse cosmetic and functional effects.

In about 15% of all cases the SMBS enabled an early malignant lesion to be verified and surgical treatment specific for the type of cancer to be chosen [4, 7]. The experience gained so far of SMBS in the diagnosis of non-palpable breast lesions suggests, as has also been corroborated at the Mammotomic Biopsy Unit of the Surgery Department I, Greatpoland Centre of Oncology in Poznan, that this new technique is probably bound to become a method of choice.

Conclusions

1. The SMBS is a new, minimally invasive diagnostic technique used in the verification of non-palpable breast lesions detected on mammography.
2. The SMBS features high sensitivity and specificity,
3. When popularized, the SMBS is likely to become a method of choice in the verification of non-palpable breast lesions.

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References

1. *Nowotwory złośliwe w Wielkopolsce*. Godlewski D (red.). Poznań: Ośrodek Profilaktyki i Epidemiologii Nowotworów; 1998; 8: 227-239.
2. *Breast Imaging and Intervention into the 21st Century. A Multi-Disciplinary Challenge*, Florida Feb. 14-18, 2000, Course Director: Parker SH; 3: 26-45.
3. Lovin JD, Parker SH, Jobe WE et al. Stereotactic percutaneous breast core biopsy: technical adaptation and initial experience. *Breast Dis* 1990; 3: 135-143.
4. Murawa P, Fedorowicz T, Kobylarek R. Ocena metody stereotaktycznego usuwania niepalpacyjnych zmian gruczołu piersiowego Mammotom-Biopsy. *Międzynarodowy Kongres Nowotwory Wyzwaniem XXI Wieku*, Poznań 2000: 37 (abstract).
5. Parker SH, Lovin JD, Jobe WE et al. Stereotactic breast biopsy with biopsy gun. *Radiology* 1990; 176: 741-747.
6. Hendrick RE, Parker SH. Stereotaxic Imaging. *RSNA Caterogical Course in Physics*, Denwer 1994; 263-274.
7. Burbank F. Stereotactic breast biopsy of atypical ductal hyperplasia and ductal carcinoma in situ lesions: improved accuracy with directional, vacuum-assisted biopsy. *Radiology* 1997; 202:843-847.

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