ABSTRACTS OF THE 4th SENOLOGIC SYMPOSIUM ORGANIZED BY A. VAN STEEN, C. VAN ONGEVAL, A. SIMILON ON MAY 29-30, 2010 IN OOSTDUINKERKE

Sentinel node procedure: is a yearly ultrasound follow-up necessary? A. Van Steen

Purpose: To evaluate the place of a yearly ultrasonographical examination in the follow-up after breast cancer surgery and sentinel node biopsy.

Material and methods: From 2003 until 2009, 1,030 patients underwent breast cancer surgery and a sentinel node excision. The indications for sentinel were made according to the EUSOMA Guidelines. For the evaluation of the sentinel node a 1,2 cc solution of 10-20 MBq 99 Tc macroaggregates was injected subcutaneously above the tumor site the day before surgery. During surgery methylene blue was injected too. The lymph nodes with the highest counts as well as the blue ones were excised. When (micro)metastases were detected a complete axillary excision was done. All patients underwent a yearly clinical examination, mammography and ultrasound of the breast and axillar and infraclavicular region. All ultrasound examinations were performed on an ALOKA 5500 or alfa 10.

Result: Already one year after surgery, two relapses in the axilla were found: one patient had a large in situ carcinoma and the second patient a medially located medullary tumor. Both ultrasound and clinical examination showed the adenopathies.

Conclusion: Also based on the results of other centers a systematic investigation of the axillary region is in the future perhaps not mandatory in certain circumstances. Further long time follow-up of this group of patients is however necessary to evaluate better the additional benefit of ultrasonography.


New preoperative localisation procedures A. Van Steen

Due to the experience with the sentinel node procedure, some new techniques using radiopharmaceuticals have been developed.

With the Radioguided Occult Lesion Localisation (ROLL) procedure, macroaggregates of technetium-99m labelled human serum albumine are injected into the lesion, instead of the introduction of a wire hook or carbon injection.

The Sentinel Node and Occult Lesion Localisation (SNOLL) is a combination of the ROLL and sentinel node procedure.

The technique of these procedures will be explained in detail.

The benefits of these procedures are the possibility to combine two procedures in one, which is more comfortable for the patient, and the possibility for the surgeon to choose the incision, without taking into consideration the site of injection. Thus the extracted tissue will be smaller and the lesions are more central located.


BIRADS-classification mammography P.A.M. Bun

The ACR breast imaging reporting and data system (Bi-rads) is a quality assurance tool designed to standardize mammographic reporting, reduce confusion in breast imaging interpretations and facilitate outcome monitoring. Newest (4th) edition: 2003

The breast imaging report should be divided into:

1. Indication for this exam
2. Breast composition
3. Findings
4. Location of lesion
5. Comparison to previous studies (if deemed necessary by the radiologist)
6. Findings ultrasound (When done)
7. Conclusion and BIRADS-classification

Mammographic breast composition

I. The breast is almost entirely fat (<25% glandular)
II. Scattered fibroglandular densities (25-50%)
III. Heterogeneously dense breast tissue (51-75%)
IV. Extremely dense (>75% glandular)

Findings

Mass and Asymmetry

A "Mass" is a space-occupying (three-dimensional) structure demonstrating convex outward borders (seen in two different projections, usually evident on two orthogonal views). An asymmetry lacks convex outward borders and cannot be identified as a space-occupying lesion (if a potential mass is seen in only a single projection on mammography it should be called an "asymmetry" until it's three-dimensionality is confirmed).

Mass morphology

Shape: round, oval, lobular, irregular
Margin: circumscribed, microlobulated, "obscured", indistinct (ill-defined), spiculated
Density: high-, equal-, isodense, low density (not fat-containing), fat-containing, radiolucent

Calcifications

Morphology (most important)
Typically benign
- Skin
- Vascular
- Coarse/popporn-like (fibroadenoma)
- Large rod-like (secretory calc/plasmapel mastitis)
- round (0,5-1 mm)/punctuate (<0,5 mm)
- Lucent-centered calcifications (<1 mm)
- Eggshell or Rim calcifications
- Milk or Calcium (sedimented calcifications in macro-or microcysts)
- Suture calcifications
- Dystrophic (coarse > 5 mm often lucent center)

Intermediate concern, suspicious calcifications
- Amorphous or indistinct calcifications: (small, hazy: no better morphologic classification determined), Diffuse/Scattered: can usually be dismissed as benign (baseline magnification view).
- Regional, segmental, clustered or linear distribution suspicious.
- Coarse heterogeneous calcifications: > 0,5 mm irregular, conspicuous tend to coalesce. Bilaterally clustered usually benign (fibroadenoma), single cluster low suspicion, linear on segmental distribution suspicious.
- Higher probability of malignancy
- Fine pleomorphic calcifications: irregular, usually < 0,5 mm, varying in size and shape.
- Fine linear or fine linear branching calcifications: may be discontinuous and < 0,5 mm in width, irregular linear or curvilinear (suggests filling irregular duct lumen breast).

Distribution modifiers

- Benign: diffuse/scattered, regional (>2 cm)
- Intermediate: grouped or clustered (> 4 in < 1 cm)
- Suspicious: linear, segmental
BIRADS-classification ultrasound
P. De Visscher

In 2003, the American College of Radiology (ACR) published the 4th Edition of the Breast Imaging Reporting and Data System (BIRADS) classification for ultrasound and MRI. BIRADS aims at providing a uniform foundation for breast imaging, standardizing the reporting system and selecting lesion descriptors that emphasize the distinctions between benign and malignant. The recommended sonographic terminology shows significant overlap with the mammographic terminology, but descriptors such as echogeneity, size, acoustic features and orientation with reference to the skin line are specific for ultrasound.

There are seven categories in the BIRADS classification: incomplete assessment (BIRADS 0), negative examination (BIRADS I), probably benign findings (BIRADS II), probably malignancy risk (BIRADS III), probably malignant findings (BIRADS IV), findings highly suggestive of malignancy (BIRADS V), and biopsy-proven malignancy (BIRADS VI). Category BIRADS IV is further divided into small (IVA), moderate (IVB) and substantial (IVc) malignancy risk. The radiologist has to decide whether a lesion is suspicious for malignancy and should be biopsied or attributes such a low risk for malignancy that the option of short-interval follow-up can be offered as an alternative to biopsy. One of the reasonable and achievable goals for diagnostic ultrasound should be to help identify this subgroup of low-malignancy risk lesions (BIRADS III) and consequently prevent unnecessary biopsies.

Breast cancer varies greatly, not only from one nodule to another, but even within an individual nodule. The entire surface of the lesion must be carefully evaluated to detect suspicious findings. The ACR’s ultrasound BIRADS lexicon identifies irregular shape, microlobulations, spiculation or angular margins, non-parallel orientation, posterior acoustic shadowing and thick echogenic halo as suspicious findings. Benign findings are elliptical shape, gently lobulated margins, hyperechoic ecchondrome, parallel orientation and complete thin echogenic capsule. Whenever there is a mixture of suspicious and benign findings within an individual nodule, the benign findings must be ignored and the lesion should be classified BIRADS IV which warrants biopsy.

References


Introduction of nationwide digital breast cancer screening in The Netherlands
P. A. M. Bun

The breast cancer incidence in the Netherlands is one of the highest in the world (1/7 women get breast cancer). There are more than 13,000 new cases per year and according to the most recent data 3300 deaths.

The RIVM (National Institute for Public Health and the environment) provides a free nationwide breast cancer screening for all women between 50 and 70 years. Almost one million women are examined per year. The examinations are performed in 14 fixed units and 52 mobile screening units. The examinations are organized, assessed and archived by 5 regional screening organisations, coordinated by one central organisation. The national expert and training centre and the national evaluation team cover training, quality control, audits and evaluation.

Starting with a referral rate of 1% which even dropped below this, an optimization was carried out, indicating that the referral rate should be increased. In 2006 this was 1.6%, accompanied by an increase in the detection rate in the following rounds to 5 per 1000. From 1998 to 2006 mortality in the 55-75 year old age group was reduced by 24%.

With the experience of 4 digital pilots the government is currently implementing a program of modernisation in which the analogue mammography units are being replaced by new digital systems, linked via a nationwide image management system with a central archive and 25 reporting units at various locations in the country, staffed by specially trained screening radiologists, who perform the double reading. The workstations in the reporting units have two high-resolution screens and a regular screen for textural information (paperless system). These are connected directly to a central archive via a nationwide optical network.

A programme of requirements was worked out with digital archiving as a central issue. More detailed issues to be men-
Different imaging modalities can show axillary lymph nodes (LN) in the axilla and the other tributary locations.

NUCLEAR MEDICINE can show LN by tracing the uptake of Technetium colloid in the lymph nodes. The technique is well known from the sentinel node procedure, currently widely used in case of tumorectomy for smaller breast tumours. It is not used as a preoperative staging modality. PET CT is a good imaging modality, with an accurate uptake of contrast, and the description of both normal and abnormal anatomy. In the last few years, the combination of PET and CT has become more frequent. FDG PET CT is probably by far the best imaging modality for studying LN, and it should always be included in a breast exam. LN are located sufficiently superficial to be studied with the same high frequency transducers used in breast imaging. Many technological evolutions have raised ultrasound imaging quality considerably. The use of frequencies of > 10 MHz (up to 18), high element probes and matrix probes improve the resolution. Harmonic imaging and compound imaging are probably the most important advances in recent years. Increased spatial and contrast resolution, with reduction of image noise contribute to the high image quality available nowadays on high end equipment. Good focalisation according to the examined depth is important. Sometimes lower frequencies are required in obese patients. Trapezoidal imaging can provide a wider view of deeper areas.

NORM AL LN are seen on US as ‘kidney-like’ structures, with a central reflective fatty hilum and a thin hypoechoic cortex, usually less than 2 mm thick, with a thickness over the complete LN. The afferent lymphatic vessels reach the LN in the periphery, and the efferent vessels are situated in the hilum, next to the vascular pedicle, that can be seen easily with color Doppler. So involvement of the LN starts in the periphery, and therefore the most important sign of metastatic involvement is cortical thickening (> 2.5 mm), frequently asymmetric. More important involvement makes the fatty hilum disappear partially or completely, and produce a more rounded hypoechoic LN, where a normal LN is rather oval shaped. Irregular contours of the LN may suggest capsular rupture and invasion of the surrounding tissue. Pathological hypoechoic areas may show an increased vascularity on color Doppler.

Different areas are to be examined to have a complete staging of LN involvement.

The mammaria interna chain is seen along the artery mammaea interna, in the parasternal intercostal spaces. This is done with a sagittal parasternal and axial intercostal orientation of the probe. Normal LN are very small and extremely difficult to see in these areas; if LN can be seen, then they are most of the time pathological.

Auxiliary and infraclavicular LN are divided in 3 groups or levels; the M. Pectoralis minor is an important landmark. Level 1 is situated lateral from the M. Pectoralis minor, level 2 is behind this muscle and level 3 medial to it. The Rottier’s space or interpectorals space is situated between M. Pectoralis minor and M. Pectoralis major, and can also contain pathologic LN. In severe stages, supraclavicular LN can also be involved.

The lateral and most superficial LN in the axilla are best visualised with the arm elevated 90°, with the US probe in the armpit. The infraclavicular LN (level 2 and 3, Rottier) are best visualised using a sagittal orientation of the probe, with the arm along the body. The landmarks, M. Pectoralis minor and major are easily seen with this approach.

When pathological features (cortical thickening, asymmetry, increased volume, ...) are present, US guided FNA or core biopsy can be performed. This makes a better selection for sentinel node procedure possible.

We try to find a preoperative procedure that would allow selection of those patients who should directly undergo axillary dissection.

The sonographic examination: we have to find the best criteria to determine the pathologic axillary lymph nodes. The size criteria is not relevant enough. The morphological criterions are more interesting. We can consider that a lymph node is pathologic when: it is round, or with an eccentric cortical hyperechogenicity, or with a diffuse cortical thickening, or with a hypoechoic hilum. With the use of sonography alone, applying morphological criterions to establish malignancy, approximately half of the axillae with metastasis would be detected (sensitivity about 48%) with a high specificity (96%).

The use of fine needle aspiration and core biopsy is difficult to synthetize and to compare the different studies, because they use different methods (morphological criterions, types of punctures, size of the primary tumor …). The
cytological and histological diagnosis of metastasis reaches 100% specificity. With both methods, we obtain a good sensitivity (75% for FNA and 82% for CSE) with slightly more advantages for the core biopsy. But the difference is not relevant and the core biopsy is more expansive and more dangerous.

So we can propose, as a general method: If you have a patient who could benefit from a sentinel node biopsy: during your sonographic examination, try to find pathological lymph nodes. For these nodes, you can do a FNA, rather than a core biopsy. If you obtain positive cytology, the patient must have an axillary dissection. If the axillary sonography or if the cytological analysis is normal, the surgeon can proceed with a sentinel node biopsy. If there is an indication of SNB regardless of the primary tumor size, it is possible to avoid SNB in +/- 30% of cases.

References

Pathologic evaluation of the axillary lymph nodes by breast carcinoma
M. Drijkoningen

- pN in the TNM-classification (7th edition)
- Macrometastases: one or more localisations of > 2 mm (pN1+)
- Micrometastases: one or more localisations of > 0,2 mm or > 200 tumourcells (pN0)
- Isolated tumourcells = submicrometastase (pN0i)
- Capsula = part of the lymph node: tumourcells in the lymphvessels of the capsula = metastase
- Postoperative investigation: histologic slice = 4 µ: less than 0,1% of the lymph node is investigated.
- Sentinel node investigation: 1-3 lymph nodes: better investigation is possible. The purpose is to find all micrometastases/micrometastases: slices of 200 µ, with specific IHC colouring.
- Peroperative investigation of the sentinel node: cutting into thin slices – macroscopic investigation – depcytology or frozen slice (only for micrometastases). The sensitivity gives 1 on 5 false positive for micrometastases and 4 on 5 false negative for micrometastases.

Depcytology is preferred: less tissue damage, no loss of tissue and both sides of the slice can be investigated. A lot of experience is however necessary.

Preoperative staging: all lymph nodes that are suspect on ultrasonography need a FNAC: in 25% of cases the sentinel procedure can be omitted.

This is a gain of time for the patient and the surgeons.

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Radiological diagnosis of precursor and pre-invasive breast lesions
C. Van Ongeval

The precursor lesions of invasive breast cancer according to the WHO classification consist of the lobular neoplasia (LCIS, ALH), ductal intraepithelial neoplasia (DIN) and intraductal papillary neoplasms. The DIN group includes flat epithelial atypia (FEA), atypical ductal hyperplasia (ADH) and ductal carcinoma in situ grade 1-2-3 (DCIS). In the group of the intraductal papillary neoplasms, benign intraductal papilloma, noninvasive papillary carcinoma and encysted papillary carcinoma can be found. A complex sclerosing lesion or atypical scar is classified as a benign epithelial neoplasms, but as there is an increase in ADH and DCIS in these lesions, they are discussed as well. Precursor lesions are frequently diagnosed by screening programs, performed to detect early stages of breast cancer.

Microcalcifications are the most frequent presentation of lobular neoplasia and the DIN lesions. Whereas ADH was previously incidentally diagnosed in biopsies for palpable masses, the incidence of ADH increases as more biopsies are performed for the BIRADS-3 and 4 microcalcifications and as larger needles are used.

Approximately 80% of the comedo type DCIS shows a typical branching pattern, but 20-25% and the non-comedo DCIS fail to exhibit these characteristics. Sonography is less important in the evaluation of microcalcifications, but is excellent to guide percutaneous biopsies for the evaluation of radial scar, papillary lesions and palpable lesions.

Vacuum assisted biopsy has a higher accuracy compared to large core biopsy for the evaluation of precursor lesions and it is therefore the preferred technique for their preoperative evaluation.

Although mammography can detect up to 83% of DCIS, it underestimates the extent of the disease. Magnetic reso-nance imaging (MRI) is better in predicting the extent of the disease and of multifocality.

The role of MRI in the evaluation or follow-up of precursor lesions is not clear yet: most of the precursor lesions will show enhancement and differentiation between the grades of proliferation is not yet possible.

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Rare presentation of breast cancer
A. Rappaport

The case of a 67-year-old woman with a large lump in the left axillary region and the left breast is presented.

Pathologic investigation of these masses in 2 hospitals was inconclusive.

Further work-up in our radiologic department showed beside the presence of the two tumoral masses, abnormalities with the radiologic characteristics of granulomatous mastitis. Final pathologic analysis showed the presence of an invasive ductal carcinoma in the two masses in combination with a granulomatous stromal reaction.

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Breast hemangioma
H. Claes

On routine screening mammograms, a small lobulated nodular mass was found in the left breast of a 66-year-old woman. The lesion was not visible on plain film. Core needle biopsy proved this lesion to be a hemangioma.

Breast hemangiomas are very rare, except for the clinically not detectable perilobular subtype. They cannot be completely distinguished from malignant tumors (breast tumors and more importantly angiosarcoma) by imaging and should be excised completely to confirm the diagnosis.