JBR–BTR, 2013, 96: 322-327.

PROCEEDINGS OF THE FIFTH SENOLOGIC SYMPOSIUM, organized in Oostduinkerke, June 2-3, 2012 by A. Van Steen and Ch. Van Ongeval

Radiologists in mammography: challenges in resource limited settings

A. Van Steen[1], G. Luyeye[2]

Western lifestyle, unfortunately, seems to result in a tremendous increase in breast cancer.

A few decades ago, on the African continent, breast cancer hardly existed. Nowadays, however, women of the African upper-class eat food that contains more fat and they have fewer children later in life, resulting in a large 'oestrogen window'.

Smoking and alcohol consumption also have a certain influence on the incidence of breast cancer.

The incidence of breast cancer still varies from country to country, e.g.: Belgium: 107 / 100,000 women, Slovakia: 47 / 100 000 women, Republic of Congo: 11 / 100 000 women.

A solid comparison between breast cancer incidence rates is only possible if each country has a reliable registration. This is often a problem in the developing countries.

Despite the fact that about 15% of breast cancers cannot be detected with mammography, it has become the standard investigation of the breast.

Radiologists attending radiology congresses are confronted with a lot of sessions on mammography, which is also the case for colleagues involved in breast cancer care.

In countries where a few years ago breast cancer was rather rare, the demand for mammography has become increasingly important. The goal is to save women's lives. Investigation with a clinical examination only is not enough to reduce breast cancer mortality: with mammography breast cancer is detected two to three years earlier than with a clinical examination, with a diameter of about 0.5 cm against 1-2 cm for the clinic.

Of course, radiologists follow this evolution, but it is often difficult to obtain good quality equipment as well as technical staff for the maintenance.

In some countries, the government (Ministry of Health) even takes decisions that make it impossible for radiologists to deliver good work. This is for instance the case in Eastern Europe: every year they go for the cheapest proposal. In this regard I witnessed the following combination (in analogue condition): an Agfa developer with Kodak chemistry, cassettes with Konica screens and Fuji films. It may be clear that, in such cases, a good outcome of a physical-technical control is impossible.

In these countries, the 'European Guidelines for Breast Cancer Screening' are also far from the reality and local possibilities.

In some African countries it is almost impossible to set up a physical-technical quality control and surveillance as one of the first concerns often is whether there will be enough electricity and water in the hospital throughout the day …

On the other hand, for a lot of people food is of daily concern and they only seek medical care when normal living is not possible anymore and pain is one of the main reasons.

Since in most cases breast cancer is not painful, women in Africa and South-America are convinced that it is not a serious disease. It is, indeed, possible to have a lot of benign lumps or nodules in the breast.

Another fact is that an African woman with only one breast will never get a husband and how could she then survive when getting older?

In African countries, most of the mammography units still work with an analogue setting.

Not only the electric power supply, but also the chemistry is a problem as the products have to be changed on a regular basis: either there is no new product available or only from another company (with different characteristics).

Perhaps the low cost CR-system could be an alternative, but radiation would be higher, and technical-physical quality of the equipment would be a constant care.

Ultrasound and needle biopsy are also important in the diagnostic setting and should be incorporated in it.

Although ultrasound is a frequently used machine in developing countries, it has its limits in big and fatty breasts, and microcalcifications are rarely seen. One would need a high-frequency probe, but this probe can also have some technical problems.

With needle biopsy you need to have a good pathologist with an adequate knowledge of breast anomalies because the difference between a benign atypical hyperplasia and a malignant well differentiated in situ carcinoma is very subtle.

In summary we might say that the Western countries (which are in fact to some extent responsible for the increase of breast cancer) should help other countries with their knowledge on the early detection of breast cancer and not only regarding the technical requirements but also in terms of radiology, positioning and interpretation of mammograms.

New insights into breast conserving therapy should also be communicated to hopefully encourage women with breast problems to see their physicians earlier.

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The digital transition: issues on proper storage of protocols ad images

W. Van Roost[1]

Relentless progress on the digitalisation of modern radiological practice brings up the issue to which extent current legislation keeps up with this evolution. As a consequence, radiologists face the conundrum how to implement a proper framework in which altered practices can be matched with often vague or even inconsistent rules and regulations imposed by law and deontology.

Existing legislation on the management of a radiology department is entirely based on the (old) analogue procedures; its core business remains the determination of reimbursement fees for different examinations. In contrast, important items, such as the regulation of communication between radiologist and either referring physician or patient, are left merely to (weaker) rules of deontology. Moreover, the recent law on individual patient's rights impacts heavily on day-to-day communication strategies used by radiologists.

At the transition from an analogue to a digital radiology practice, the focus shifts towards extremely sensitive responsibilities regarding safe storage, reproducibility and continuity of care. From a deontological point of view, there is a major shift of responsibility from 'keeper of the patient file' (the clinician or referring physician) to the radiology department. Subsequently, important issues emerge on the precise organisation of the electronic prescription or referral, the handling of the digital data that make up both the image and its protocol, and finally on the digital communication with the referring physician.

The above summarized items clearly underscore the urgent need for an updated formal legislation on the digital work environment of a modern radiological practice. This is particularly the case for the digital prescription, communication and applications in the broader patient's file. Hopefully, it can be expected that a future and robust e-Health platform can provide a swift solution for these problems.

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Digital mammography for breast cancer screening in Wallonia

A. Vandenbroucke, M. Candeur, L. Gordower[1]

A breast cancer screening programme with screen film started in Wallonia in June 2002. The second reading was performed in 5 coordinating centers at the provincial level.

Since the year 2006, some accredited mammography units have left the programme because they had moved to digital mammography.

A survey made in June 2007 showed that, at the end of 2008, 63% of them are going to be digitalized.

Therefore, the Ministry of Health decided to introduce digital mammography into the Programme and to set up a single Center for second reading. A decree of Government was published in July 2008. It describes, among other, the approval requirements for the second reading center and for the mammography units.

The second reading Center is equipped by a PACS allowing archiving of images into the original format DICOM and by a diagnosis console able to read mammograms from various types of equipment. A computer system ensures the link of medical records to the images produced by the accredited mammography units. The database called "Mammorias" (Mammography Radiology Information and Administrative System) is accessible, via a secured web interface, to all users (administrators, technologists, radiologists) with private and confidential usernames and passwords, allowing differential access to information.

The results of the readings are encoded by the radiologists into the database. The pictures are transferred to the second reading Center via a secured internet connection, by sFTP or VPN procedures.

The sFTP procedure (Secure File Transfer Protocol) is manageable through simple and free software that can be set up rapidly.

The VPN procedure (Virtual Private Network) allows bidirectional transfer of images in an automated way from PACS to PACS, and enables the first mammography units downloading dynamic archives stored at the second reading Center.

Both procedures require an internet connection of an ascending flow (upload) at least 512 Kbit/s.

The second/third reader calls a worklist of readings thru the RIS which loads the images stored in the PACS on the console.

Result letters, generated by Mammorias are sent to referring physicians within maximum

6 working days after the Mammotest was performed. If the Mammotest requires further investigation, a CD-ROM-copy of the mammogram is attached to the letter.

The results can also be transmitted electronically by a secured procedure.

The digital breast cancer screening programme is running since September 2009.

In June 2012 there were 44 DR and 37 CR mammography equipments.

Some indicators have been analysed to compare the performance of CR (n = 13.442) and DR (n=18.790). The more evident discrepancies are a higher image quality in DR (93% versus 88,2% for desirable level), and a higher rate of DCIS in DR (15,7% versus 6,9%).

The centralization of the double reading and the archiving of the images are of a major interest for reanalysis of images in case of interval cancer, and for evaluation and training of radiologists both 1st and 2nd readers.

We are building a data base for teaching them according different topics: radiological anomalies and BI-RADS classification.

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Breast cancer during pregnancy: the obstetrician/paediatric perspective

F. Amant[1]

Although there are no guidelines for obstetricians to monitor pregnant patients treated for breast cancer, some recommendations have been suggested (Amant et al., 2012a). It is advisable to perform the prenatal care of women with breast cancer during pregnancy (BCP) in a high-risk obstetric unit. Before starting staging examinations or oncological treatment, a prenatal screening ultrasound should be performed to ensure that the foetus has undergone normal development and growth to date. Before every chemotherapy cycle, an evaluation of foetal morphology, growth and well-being must be carried out by a perinatologist. In case of abnormal findings a more intense foetal monitoring or even (preterm) delivery may be required. It is important to consider foetal wellbeing and counsel patients to be alert when contractions occur, since an increased incidence in preterm contractions was reported after cytotoxic treatment during pregnancy.

The timing of delivery should be balanced according to the oncological treatment schedule and the maturation of the foetus. As in non cancer patients, term delivery (> 37 weeks) should be aimed for (Van Calsteren et al., 2010). Early labour induction results in prematurity and low birth weight that have been identified as contributing factors in the cognitive and emotional development of children (Lohaugen et al, 2010; Tamaru et al., 2011). In the event that preterm delivery is inevitable, foetal lung maturation should be performed according to local policy. The mode of delivery should be determined based on obstetrical indications. To allow the bone marrow to recover and to minimize the risk of maternal and foetal sepsis and haemorrhage, delivery should be planned at least 3 weeks after the last cycle of 3 weekly chemotherapy, and chemotherapy should not be administered after 35 weeks since spontaneous labor becomes more likely (Amant et al, 2012a). Furthermore, neonates, especially preterm babies, have limited capacity to metabolize and eliminate drugs due to liver and renal immaturity. The delay of delivery after chemotherapy will allow foetal drug excretion via the placenta (Sorosky et al, 1997). Chemotherapy can be restarted immediately after vaginal delivery, but an interval of one week after an uncomplicated caesarean section is needed.

Until recently, little data on the long term outcome of children after antenatal exposure to chemotherapy have been available, despite the fact that oncologic treatment of maternal cancer during pregnancy has become more acceptable in the last decade. Therefore we did set up a study to document general health, cardiac function and neurodevelopmental outcome in children who were prenatally exposed to chemotherapy (Amant et al., 2012b). We reported on exposure of 236 cycles of chemotherapy that were administered in 68 pregnancies. Seventy children, born at a median gestational age of 35·7 weeks (range, 28·3-41·0; 47/70 < 37 weeks), were included with a median follow-up period of 22·3 months (range, 16·8-211·6). Although neurocognitive outcomes were within normal ranges, the high incidence of preterm birth had a negative influence on cognitive development. Children's behaviour, general health, hearing and growth were reported as in a general population. A severe neurodevelopmental delay was seen in both members of a twin (3%). Cardiac dimensions and functions were within normal ranges. Based on these data we did conclude that fetal exposure to chemotherapy was not associated with increased morbidity at the level of the central nervous system, cardiac, and auditory functions, as well as general health and growth. We noted more subtle changes in cardiac and neurocognitive measurements that underscore the importance of longer follow up. Importantly, prematurity was frequently encountered, and was associated with impairment in cognitive development. Therefore, we believe that perinatologists should be part of the interdisciplinary discussion and that iatrogenic preterm delivery should be avoided as much as possible.

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CT and MR during pregnancy and lactation

M. Van Goethem, I. Verslegers, G. Hufkens, I. Biltjes, P. Parizel[1]

CT and MR can be helpful in cancer detection and staging. Moreover, in case of infections or trauma CT or MR can be necessary. Guidelines exist for the use of medical imaging during pregnancy and lactation.

Radiation exposure

Deterministic effects

Normal exposure for diagnostic radiology or nuclear medicine never results in cumulative fetal doses of more than 100 mGy, which is the dose threshold before damage occurs.

Stochastic effects

Fetal doses up to 1 mGy are acceptable, with an incremental risk of carcinogenesis less than 1/10000. For an examination between diaphragm and knees, the risk is 1/250.

CT during pregnancy

Fetal radiation doses up to 1 mGy are considered acceptable. For larger doses the risk of carcinogenesis doubles, although remains low in absolute terms. Radiation dose reduction models should be implemented. For every examination, a medical physicist must be consulted and informed decision with the parents must be made.

Magnetic resonance

No known harmful effects are reported with 1.5 T, but the use of higher field strength should be avoided.

Clinical MR produces 80-120 dB, the American Academy of Pediatrics allows 90 dB.

Sound attenuation in the abdomen of the mother is 30 dB.

The guidelines for MR are:

– ICNIRP (International Commission on Non-Ionizing Radiation Protection): recommends to postpone MRI until after the 1st trimester.
– ACOG (American Congress of Obstetricians and Gynecologists): MR is better than RX
– ACR (American College of Radiology): benefit-risk, even during the first trimester.

Iodinated contrast during pregnancy

No mutagenic or teratogenic effects have been described. In vivo and in vitro tests in animals revealed no deleterious effects. Potential impact on the neonatal thyroid gland must be considered. The guidelines are that iodinated contrast media may only be used when:

– No alternative test
– Information of the study is useful to mother and child during pregnancy
– Imprudent to delay imaging
– Informed consent about
– Risks benefit
– Alternative diagnostic test

ESUR (European Association of Urology) recommends that thyroid function of the foetus should be checked in the first week of life.

Gadolinium based contrast during pregnancy

Gadolinium is harmless in chelated form, but severely toxic in its free form! The longer the chelate molecules remain in the amniotic fluid, the greater the potential for dissociation of gadolinium ion. Therefore, caution must be exercised, and it may only be used when it is essential to the diagnosis. The ESUR recommends the use of the most stable agent: macrocyclic agents.

Contrast and lactation

Recommendations of ACR are that it is safe to continue breast feeding. But the woman must be informed about a small exposure, to allow her temporary cessation and discard the milk during 24 hours. The taste of the milk may change!

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The impact of breast density on risk calculation

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The mammographic image of the breast changes in function of the distribution (resp. of the epithelial and the connective tissue), the fluid and the adipose tissue.

The capacity of attenuation of the X-ray beam by each of these components is important as well.

On a mammogram, the fat tissue becomes dark, whereas the epithelium and connective tissue are clear. The proportion of these elements in each breast determines the mammographic density.

Since the first mammography machine in 1963, his designer Prof. Ch. M. Gros (Strasbourg/F), has divided the breast image on the basis of the connective structures only.

In 1976, Prof. John Wolfe (Detroit/USA) created a new classification with 4 categories (N1: fatty breast; P1 and P2: glandular breast; DY: dysplastic breast). He also calculated the risk for breast cancer (resp.: 0.1; 0.4 and 1.7; 2.2), and received a lot of criticism, because nobody could prove his results.

In 1982, Norman Boyd (Toronto/USA) made another classification, based on the breast density, with 6 categories.

In 2003, with the 4th edition of the BIRADS lexicon, the breast density was subdivided into 4 categories (I to IV: from < 25% radiodensity to > 75%). The subdivision is comparable with the Wolfe classification.

Until now a lot of articles have been published on this subject. Subjective interpretation is reduced by using several independent readers or computer analysis (e.g. Quantra – Volpara).

A study in our institution on 184.000 women (screening population 50-69 years) has shown a concordancy between the readers of 80%.

Various studies with a lot of women involved (up to 1 million) (Kerlikowske – Barlow): versus Birads I, the RR for Birads II is 2.19, for Birads III: 2.97 and for Birads IV 4.02. Increase in density is also increase in cancer (from Birads I to II: 5.6; from Birads I to III: 9.9).

Prof. Daniel Kopans had some criticism in connection with the evaluation of breast density by mammography:

– due to problems with positioning the breast might not be visualised entirely;
– problems of compression give differences in density;
– problems of the characteristics of the mammography machine (analogue versus digital);
– other risks: age, familial, menopause, BMI are not explored.

Other techniques were used as well: ultrasound, MRI, tomosynthesis, dual energy.

Due to the density there is the possibility of a mask effect, but follow up of dens breasts during 7 to 8 years (N. Boyd) still showed a higher risk.

Conclusion

Mammographic density becomes a risk factor.

This factor is not included in the big risk tables (Gail, Claus etc.) because the reproducibility of the evaluation of breast density is very difficult.

A lot of studies suggest that for women of Birads IV the risk to develop a breast cancer is 4 to 5 times higher.

With the availability of 3D images, new studies are needed to confirm these 2D results (MRI studies?)

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Imaging of breast implants

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We review the various imaging findings encountered after breast augmentation surgery.

Breast implants can be surgically introduced with a selection of diverse surgical approaches and may be either positioned deep to the breast parenchyma (i.e. prepectoral or retroglandular) or deep to the pectoralis muscle (i.e. retropectoral). The differences between saline and silicone implants are pointed out. Shortly after breast implantation, a fibrous capsule develops around the breast implant. This is the result of a physiologic reaction and should not be confused with capsular contracture, which is predominantly a clinical diagnosis.

When the silicone-polymer shell of a saline implant ruptures, rapid implant decompression ensues. Therefore, saline implant rupture is frequently a clinical diagnosis. The collapsed silicone shell will appear wrinkled and folded on imaging. Silicone implant rupture can be classified as intracapsular or extracapsular depending on the location of silicone relative to the fibrous capsule. Most implant ruptures are intracapsular. In intracapsular rupture of a silicone implant, the silicone is still contained by the fibrous capsule around the implant. On the mammogram, intracapsular rupture may sometimes be seen as a rim of silicone in close approximation of the implant. An implant contour bulge may also suggest implant rupture, though this may also be seen with focal weakening of the implant shell (without rupture). On ultrasound and MRI, intracapsular rupture can be seen as a collapsed implant shell floating within silicone gel. This presents on ultrasound as a stepladder sign and may present either as a linguine sign, teardrop sign, keyhole or noose sign, or the subcapsular line sign on MRI. Free silicone in the breast may be the result of extracapsular rupture of a silicone implant, or it may also result from the direct injection of liquid silicone in the breast parenchyma. Extracapsular rupture may be identified on imaging when silicone is present away from the implant, either in the breast parenchyma, along the pectoralis muscle or in the axillary lymph nodes. On ultrasound, free silicone may be seen as a snowstorm appearance, or it may also present as small anechogenic cyst-like collections. Direct injection of liquid silicone in the breast parenchyma was banned in the Western countries in the seventies because of reports of adverse effects, though it is still common practice in some Asian countries. We end this educational exhibit with the presentation of two Asian patients who presented with new opacities on the mammogram as the result of free silicone injection.

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Dose and image quality in breast cancer screening: differences between CR and DR technology

H. Bosmans[1]

X-ray dose is linked with both image quality and risk. It is therefore a major factor in the settings of X-ray devices. This is especially the case in mammography screening where large groups of asymptomatic women are invited for a breast X-ray examination.

The quantity to express the radiation induced detriment to the breast is the so-called 'mean glandular dose'. It is calculated from the entrance exposure to the breast, the quality of the X-ray beam, the thickness of the compressed breast and the glandularity or the percentage of glandular tissue in the breast. Usually, rather than using a woman specific estimate of the glandularity, group averages are used. The distribution of glandularity as a function of compressed breast thickness in a UK screening population is the most common input.

Patient dose surveys in mammography can be performed in a classical way that follows from the formula to calculate the dose: by means of fill in forms, entrance exposure (mAs), beam quality (anode/filter and tube voltage), compressed breast thickness and age of the woman are noted down and processed. Today, images with a properly completed DICOM header can be input to automatic tools for dose calculation. Hence, all the required data have a specified location in the DICOM header. Unfortunately, however, in CR systems, this DICOM header is not always foreseen of all exposure related data.

The spread in doses among woman is due to differences in the compressed breast thickness and glandularity and depends also on how the system is set up. Some X-ray systems keep the detector air kerma constant irrespective of the breast thickness or glandularity, while other systems have selected set doses as a function of thickness. Due to all these differences, it is common practice to calculate the 75percentile of a dose survey, along with mean and median values. In practice, mammographic units may learn most from direct comparison to data of similar centers. We have observed that the mean glandular doses as obtained with computed radiography (CR) are significantly higher than the doses obtained with direct digital systems (DR).

Image quality in (digital) mammography is usually evaluated by means of a contrast detail analysis. This method obtains for a series of disks with given diameter the thickness of gold that is needed for the disk to become visible. Detectability of the disks depends on factors such as the sharpness of the imaging system, the dose at which the system is operated and the intrinsic contrast generated by the X-ray beam. There are 2 approaches to come to the results: either have human observers find subtle disks at the limit of detectability and find in this way the so-called 'threshold thickness' or, on the contrary, score the images by 'mathematical observers', i.e. a software tool that estimates how a human observer would score the disk. The European Guidelines for Quality Assurance are unique: they specify strict limits. Computed Radiography systems are to be used at mean glandular dose levels close to the acceptable levels. Otherwise they don't pass the image quality criteria.

An evaluation of our clinical screening performance parameters showed no difference between cohorts screened with CR versus DR. This was a reassuring finding for our screening program. From technical point of view DR is a preferred technology, as significantly lower doses are used.

Recently, a new generation of CR plates was introduced for mammographic applications, namely phosphor plates with needle shape crystals. This improves the sharpness and allows a more sensitive detector. Both factors help to acquire a better image quality. These new plates are promising technology for screening applications.

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Survey results amongst first reader radiologists. An evaluation of the involvement of first reader radiologists in the Flemish breast cancer screening programme.

I. Boelaert[1]

The Public Breast Cancer Screening Programme Working Party (Vlaamse Werkgroep Bevolkingsonderzoek Borstkanker)(VWBB) is the steering committee which directs, follows up and evaluates the programme in Flanders.

The VWBB wished to evaluate the involvement and commitment of first readers and radiologists in the Flemish screening programme, in order to establish a participation benchmark and also to identify opportunities for more effective intervention.

A study protocol was developed and questionnaire drawn up. Invitations to participate in the survey were sent to all first reader radiologists. The survey questions related partly to their own working practice within the screening programme, and partly to their knowledge of the various external organisations involved in the programme and the degree to which the respondents cooperated with these organisations.

Between February and April 2012 radiologists could complete the survey online, via the website www.uwantwoord.be. Participants in the Oostduinkerke senology symposium (5e Senologisch Symposium) were able to submit their responses on paper.

A total of 103 responses were received, 59 online and 44 on paper. The findings analysed across both groups were so similar that they may be treated as a single sample for research purposes.

Results

70% of radiologists 'first readers' work within a hospital setting, whilst 25% work in private practice. Half of the hospital-based respondents work with dedicated breast clinics and retain specially trained technical personnel to take mammograms. This in contrast to their private practice colleagues who perform the mammograms personally.

There was no difference between the two groups in their use of digital technology (80%), which played an increasingly important role in screening.

The ratio of screening mammograms to the total number of mammograms performed, varied widely, from around 5 %, up to 90%.

First readers are, on the whole, quite satisfied about their professional relationship with the Centrum voor Borstkankeropsporing (CBO-Centre for Breast Cancer Screening). They are generally pleased with the level of administrative support available to them, access to the secretariat, the availability of colleagues as 'second readers' and the report evaluation service.

However, there is a definite demand from first readers for extra training, which they would like the CBO to organise.

First readers unanimously express a high degree of satisfaction with the support given by organisations that perform physical-technical controls.

There is a only limited knowledge amongst first readers about LOGO's (Lokaal Gezondheids Overleg) (local health promotion bodies) and the importance of their work in raising awareness of breast cancer screening programmes within the target population. This might explain why so few radiologists are actively involved in awareness-raising programmes.

Knowledge about the committees which control and direct the screening programme is also poor. Only half of first readers know anything about The Flemish Working Party, who amongst other duties, organise licenses for mammography units.

However, The association of CBO's and its radiology sub-committee , which is responsible for approving new equipment and the quality control of mammography, are better known.

A large number of respondents suggested that the high ratio of diagnostic to monitoring mammography is the reason why the target figures set out in the public health screening programme have not been met. Very few suggestions were received on techniques to improve attendance at screening programmes. Respondents saw only a limited role for themselves in these awareness raising activities.

The Symposium lecture given on 3 June, was previously presented at a meeting of The Public Breast Cancer Screening Programme Working Party (Vlaamse Werkgroep Bevolkingsonderzoek Borstkanker) on the 10th May 2012.

Action points will be taken up by The Working Party and The Consortium.

1. NUR first reader representative on the steering committee to The Flemish Breast Cancer Screening Programme.

Bilateral breast nodules due to Wegener granulomatosis

M. Camerlinck, I. Verslegers, M. Van Goethem, P.M.Parizel[1]

A 70-year-old female patient with known Wegener granulomatosis, at the time of consultation free of clinical symptoms, showed bilateral masses in the breast on mammography. MRI was performed and confirmed bilateral hypervascular lesions with different types of time-intensity-curves on dynamic contrast enhanced imaging (both "benign" and "malignant" profile) and low to intermediate ADC-values on diffusion weighted imaging. Ultrasound showed heterogeneous, hypervascular hypoechoic lesions without acoustic shadowing. No imaging modality showed enlarged axillary lymph nodes. Core needle biopsy was performed in three lesions and confirmed the diagnosis of Wegener granulomatosis of the breast. Breast lesions due to Wegener granulomatosis are very rare and mostly occur in patient with longstanding disease. If present, tumour-like lesions are found. These lesions can be used to monitor treatment response.

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Recurrent breast abscesses

M.I. Wessels, I. Verslegers, L. Hufkens, M. Van Goethem, P. Parizel[1]

A 36-year-old female presents with recurrent abscesses in the right breast. Her medical history consists of four drainages of abscesses in the right breast and antibiotic treatment for 3 months. There are two palpable masses in the right breast. No inflammation of the skin is seen and the breast is not painful.

On mammography a scar and an irregular oval mass in the right breast are seen. Ultrasound shows hypoechoic masses with internal vascularisation and a hyperechoic rim. On MRI there is a lesion with rim enhancement and irregular margins and an area of diffuse enhancement.

The core biopsies reveal fibroadiposis, granulation tissue and granulomatous inflammatory reaction. The diagnosis of granulomatous mastitis is confirmed.

Granulomatous mastitis is a rare, benign inflammatory disease of the breast. The clinical and imaging characteristics are similar to breast cancer and therefore it is important to know the disease and to recognise it. It affects women of childbearing age or with a history of oral contraceptive use and develops within 6 years after pregnancy. The mammography can be normal or can show multiple masses. Ultrasound shows an irregular hypoechoic mass with tubular extensions with posterior shadowing. On MRI the differential diagnosis between malignant disease and granulomatous mastitis cannot be made, it is only useful for follow-up.

The treatment is non surgical with corticosteroids and methotrexate. In case of abscedation or superinfection antibiotic therapy is added to the treatment.

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Breast imaging in children and adolescents: evaluation of the diagnostic process in this young age group

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Background: 680 children and adolescents under the age of 25 had imaging of the breast in the University Hospitals of Leuven between August 2007 and August 2011. Motifs, findings and implications of imaging were evaluated retrospectively.

Imaging findings or procedure details: Children and adolescents (64 males, 616 females) presented for breast-imaging. The major reason to consult was changed palpation, pain or family history. In women, mostly no alterations (245) or benign pathology (fibroadenomas (274), gynaecomasty (59), cysts (46) and abscesses (10)) were detected and patients and parents could be reassured. Unfortunately malignancies were also diagnosed (angiosacroma, DCIS, IDA). All had ultrasound, 20 mammography, 2 had a CT scan and 19 an MRI. Biopsy was performed in 125 women and FNAC in 19. In men uni- or bilateral gynaecomasty was confirmed (59) after ultrasound; 29 patients underwent mammography. Our findings are similar to those presented in literature.

Conclusion: knowledge of diagnostic procedures in children and adolescents is essential for current practice. Ultrasound is the modality of choice; mammography is contraindicated. Core biopsy has an key role in making correct diagnosis in a preoperative setting and in reassurance, since most of the breast alterations in this age group are normal or benign. Unnecessary surgery can be avoided.

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