Causes of skull radiolucencies

Normal

Squamous temporal bone
Pacchionian granulations
Surgery

Air

Superficial—after scalp injury
Intracranial—seen in open fractures

Outer skull table

Rodent ulcer

Inner skull table

Slow growing tumours
Chronic subdural haematoma

Diffuse lesions

Metastases
Multiple myeloma
Paget's disease
Hyperparathyroidism

Areas of reduced density are more common than sclerotic areas. There is a wide variation in the normal ossification of the calvaria, making differentiation of abnormalities difficult. Clinical history and examination are important in excluding many of the possible diagnoses.

Summary

Diagnostic quality

Bones

Sella—size, erosion, shape
Cranium and base—fractures

Cartilage and joints

Sutures
Craniocervical region—C1/C2 fracture or
subluxation, posterior nasal soft tissue

Soft tissues

Artefacts and foreign bodies
Intracranial air—anterior aerocoele, brain
stem intraventricular
Sinus air-fluid levels—sphenoid, frontal,
maxilla

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American and European recommendations for screening mammography in younger women: a cultural divide?

Ismail Jatoui, Michael Baum

The American Cancer Society advocates mammography screening for all women from age 40, whereas in Europe it is not recommended for women below the age of 50. Randomised prospective studies have failed to show a significant benefit from screening women aged under 50 and five potentially harmful effects of screening should be considered: lead time, overdiagnosis, radiation exposure, false positive results, and cost. Younger women must be properly informed about the potential for harm as well as for benefit before screening.

Two consensus conferences were held in February 1993 to assess the value of screening mammography for women below the age of 50. Meeting in Paris, the European Society of Mastology recommended that screening mammography be reserved for women above the age of 50,¹ while at a workshop in New York the American Cancer Society reaffirmed its longstanding policy of screening women starting at age 40. Both societies reviewed the same data but arrived at different conclusions. How can this be explained? Putting aside any uncharitable suggestions concerning profit motives and a return on the capital costs of mammographic equipment, and assuming that the data are understood equally well we must conclude that the responses are fuelled by cultural differences on either side of the Atlantic.

The American author Lynn Payer writes about these differences in her book *Medicine and Culture*: "In the face of rising death rates from breast cancer Americans call for more aggressive screening, in spite of the fact that there is not much evidence that screening women under the age of 50 will prolong survival."² Indeed, American culture seems to dictate that some sort of medical intervention is better than nothing, and

Americans are reluctant to accept the conclusions of clinical trials which fail to support a commonsense view. Europeans are more willing to accept these trials at face value and in the case of screening mammography evidence so far shows no significant benefit for screening women under the age of 50. But although evidence of benefit is lacking the greater concern is whether screening younger women does more harm than good.

Biases of clinical studies

Various techniques have been used to study the efficacy of mammographic screening: case-control studies, retrospective analyses, and prospective series. Most studies have used length of survival as the end point for comparison. However, the success of screening mammography should not be measured by its ability to extend survival from the point of diagnosis but by its ability to reduce mortality.

Any trials that examine screening mammography will have lead time bias, which is the interval between the diagnosis of cancer on mammography and the time when the cancer become apparent clinically. Lead time bias makes comparisons of survival between screened and unscreened populations meaningless. This is illustrated by comparing the retrospective study of Stacey-Clear *et al* with the Canadian prospective breast screening trials.^{3,5} Both studies showed a good five year survival for screen detected cancers among women under 50, but at the seven year follow up the Canadian study showed a non significant excess mortality in the screened population. This could be explained only by assuming a lead time bias of up to four years.

These trials often have other types of bias as well. Screening mammography tends to detect slower grow-

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VOUJARD/GAMMASPOONER

The benefits of mammography screening from age 40 remain improved

ing tumours. Such tumours exist for a relatively long time before becoming clinically apparent, increasing the chance of detection by screening. In contrast, the faster growing tumours exist for a shorter time in the preclinical phase and are less likely to be detected at screening. This is length bias, and it invalidates comparisons of tumours picked up on screening with those detected on clinical examination between screening. Finally, clinical trials which recruit volunteers contain selection bias. Women who volunteer for screening are more likely to be health conscious with lower all cause mortality. The only way to exclude all these biases is to compare screened and unscreened populations in a randomised study that uses all cause mortality as the end point, with cause specific mortality as a questionable surrogate end point.

Randomised studies

The Health Insurance Plan trial was the first randomised study. It is the trial that has shown benefit from screening women under the age of 50, although it was not specifically designed to assess different effects of screening in various age groups.⁶ The benefits of screening reported from this study cannot be entirely attributed to mammography because screened women were given a physical examination as well as a mammography, and only 19% of the cancers were detected by mammography alone. The study found a 25% relative reduction in mortality in screened women under 50. The reduction was seen only after long term follow up, when the women were in their 50s. Had these women been screened after the age of 50, a similar benefit might have been observed.

On the other hand, the Swedish Malmö study found a non significant 29% excess in mortality from breast cancer when women under age 55 were screened,⁷ and a similar trend was observed in the recent Canadian study.⁴ One possible explanation for this is that screened women are given a false sense of security and that interval cancers (those which develop between screening sessions) are likely to be neglected. Two other randomised prospective studies, the Swedish two county study, and the Edinburgh study,⁹ have shown no significant difference in mortality between screened and unscreened populations under age 50.

Most recently the Swedish overview of trials, involving about 90 000 women under 50, showed a non significant reduction in relative risk (13%, 95% confidence interval 37% to -20%).¹⁰ We can use this result to calculate the absolute benefit of screening. If we assume that the risk of a 40 year old woman developing

breast cancer before the age 50 is 1.0% and her risk of dying from it is 0.5% (worst case), the absolute reduction in risk would be $0.5\% \times 13\%$, or 0.065% (95% confidence interval 0.18% to -0.10%). Therefore, although intuitively screening young women might be expected to reduce mortality significantly, this is not supported by the results of randomised clinical trials.

But have the studies performed been too small to detect a real benefit from screening? To address this concern, a randomised study of 200 000 women has recently been started in the United Kingdom.¹¹ These women will be randomised into a study group of 65 000 who will be invited for seven annual mammographic screens beginning at age 40, and a control group of 135 000 with no intervention. The women will be followed up for 10 to 15 years.

Harmful effects of screening

Proponents of screening in women under 50 argue that evidence of benefit will be found and that screening should be continued on the assumption that it does no harm. However, five harmful effects of screening need to be considered: lead time, overdiagnosis, radiation exposure, false positive results, and cost.

LEAD TIME

Although breast cancer might be detected earlier by mammographic screening, this does not necessarily translate to reduced mortality. A lead time of two to four years has been postulated as a result of screening,^{3,5} meaning that many women are given two to four years' advanced notice that they have breast cancer with no tangible gain resulting from it. This clearly has a negative impact on quality of life.

OVERDIAGNOSIS

An increasing number of breast cancers are being diagnosed by screening mammography, and about 23% of these prove to be ductal carcinoma in situ.¹² As a result of screening there has been an apparent increase in the incidence of ductal carcinoma in situ. The natural course of these carcinomas is not known, and many are unlikely to progress to invasive cancer. Necropsy in a series of women aged 20-54 years who had died from accidents or violence found ductal carcinoma in situ in 14% of women,¹³ suggesting that occult lesions are quite common in younger women. The prevalence was four to five times higher than the number of overt cancers expected to develop clinically over 20 years. We are probably overdiagnosing breast cancer in many women, producing needless anxiety and denying them health and life insurance by wrongly labelling them as cancer patients.

RADIATION EXPOSURE

A small group of patients who carry the gene for ataxia telangiectasia (about 1.4% of the population) may be at increased risk of developing breast cancer as a result of low dose radiation.¹⁴ This risk seems to be greater in younger women, and the risk of screening these women may exceed any potential benefit. Women with a family history of ataxia-telangiectasia should seek alternatives to mammography, but most carriers have no family history.

FALSE POSITIVE RESULTS

False positive results of mammographic screening can seriously affect the quality of life. Analysis of data from the American breast cancer detection demonstration project suggested that the positive predictive value of mammographic screening was 10%. Thus nine women had a false positive result on screening for every

cancer found. European studies have indicated positive predictive values ranging from 30% to 60%.¹⁵ These figures represent the positive predictive value of screening in all age groups. If women below the age of 50 were considered alone, the incidence of false positive results would probably be higher. Besides the disfigurement caused by unnecessary biopsies, the period of uncertainty is very stressful for the women and their families.

COST

All health services are looking for ways to contain costs. Resources must be spent on proved treatment and preventive care. As no evidence exists to support the efficacy of mammographic screening in women under 50 it is unreasonable to ask for public support. In the United States the cost to society of screening women aged 40-50 will be over \$402 million by the year 2000.¹⁶

Even if we accept the results of the Health Insurance Plan study and assume a 25% relative reduction in mortality from breast cancer this translates to only a 0.125% absolute reduction in deaths, which means that one life would be saved for every 1250 women screened. One radiation induced cancer caused by 12 500 mammograms over 10 years would wipe out this small benefit as would one suicide or treatment related death per 1250 women screened.

Informed consent

A compromise between the recommendations of the European Society of Mastology and the American Cancer Society would be to obtain informed consent before screening. In their discussion of the value of screening mammography in women below 50 Eddy *et al* commented: "existing evidence does not justify the conclusion that failure of an individual physician or organisation to recommend or cover mammography is bad medical practice or constitutes malpractice."¹⁶ If

anything, the reverse is true—advocating mammography for younger women without obtaining proper informed consent, including the potential for harm as well as for benefit, must be considered negligent. These same standards must also be applied to women who obtain screening mammograms in the private sector. If it is not appropriate to screen younger women in a national programme then it is not ethical to screen them privately without first obtaining informed consent.

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Clinical analysis of 100 medicolegal cases

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Abstract

Objective—To find the reasons for legal claims against hospital doctors.

Design—Prospective analysis of requests for medical opinion submitted by solicitors during 1984-93 on legal claims against hospital doctors.

Subjects—100 successive cases: 98 from the United Kingdom and two from the Republic of Ireland.

Main outcome measures—Principal underlying causes of claims.

Results—In 44 cases there was no serious clinical error. Of the 56 cases of clinical fault, seven were a failure of communication by doctors, 15 were an isolated error in otherwise good clinical management, 21 were errors that might not have occurred with better control of clinical practice (doctors exceeding their competence, poor clinical judgment, and poor teamwork), and 13 were major errors due to carelessness or incompetence. In 34 cases there was evidence of clinical fault that might escape clinical audit and medicolegal processes. Most of these legal claims have been or are likely to be withdrawn: only five plaintiffs have settled out of court, and 11 are pursuing their actions.

Conclusions—To reduce the incidence of errors, hospital doctors should consult colleagues about

difficult cases and specialists should maintain a broad interest in disease. The NHS clinical complaints procedure should be extended to cover potential claims, and serious cases should be subject to independent external assessment by experienced consultants.

Introduction

Over the past five years patients' organisations have become increasingly vocal in their demands for greater flexibility in the handling of clinical complaints against hospital doctors. In particular, they wish to make it easier for the complainant to determine what went wrong, to improve the handling of formal complaints, and to change the present medicolegal system, which is perceived to be expensive and loaded in favour of the defendants.^{1,2}

The medical profession has not ignored the problem and has offered cautious support for the development of some form of no fault compensation.^{2,3} Nevertheless, except in limited areas (the confidential enquiries into perioperative deaths⁴ and maternal deaths⁵), it has not addressed the more important issues of determining the epidemiology of medical accidents, assessing causative factors, and applying this knowledge to reducing the incidence of harmful episodes. The

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