Use of diagnostic imaging in Australian general practice

Dear Editor

I read with interest the article by Miller et al[1] (*AFP* May 2006). The data that have been collected are useful, in the sense that it is helpful to know how much imaging is being requested, of what type, and for what stated indications. However, I take great issue with the conclusion, included in the discussion that '... data suggest generally appropriate selection of imaging techniques by GPs in Australia'. Putting aside the question of what 'generally' means in the absence of any quantitative data on appropriateness, there can be no way in which the authors of the article can reach this conclusion on the data presented. To take just a few examples:

- While a plain X-ray may be the appropriate choice of imaging for a suspected fracture, were internationally accepted guidelines adhered to with regard to whether any imaging was indicated (eg. the Ottawa rules for ankle and knee trauma)?
- What were the indications for imaging in 'back complaints'? In the absence of acute neurological signs/symptoms or other 'red flags', imaging in the first few weeks of symptoms may not be indicated
- Similarly, in the absence of red flags, cranial CT may not be indicated for headache
- What were the criteria for determining whether CT or ultrasound was indicated for 'abdominal pain'?

Appropriateness of diagnostic imaging is very difficult to assess and is a multifacetted problem. Not only is there the question of the correct choice of imaging, but also whether any imaging is indicated and, if so, the timing of it.

Interpretation of data is impossible without attempting to categorise imaging requests into a 'taxonomy' of appropriateness, for example:

- imaging performed, but none indicated
- no clinical question posed
- no potential for change in diagnosis
- no potential for change in management
- wrong test performed
- alternative test more accurate
- nonionising radiation (ultrasound, MRI) preferable
- correct test, wrong timing
- correct test, correct timing, inappropriate technique (eg. high resolution chest CT vs. standard CT).

The authors may be correct in their conclusion, in which case Australian GPs are particularly well informed about the role of imaging and the Australian public is very fortunate – rather more fortunate than in other countries.[2] However, their conclusion cannot be drawn on the data presented.

Richard M Mendelson
Royal Perth Hospital, WA

References

1. Miller G, Valenti L, Charles J. Use of diagnostic imaging in Australian genera; practice. Aust Fam Physician 2006;35:280–1.
2. Picano E. Sustainability of medical imaging. BMJ 2004;328:578–80.

Reply

Dear Editor

I thank Professor Mendelson for his comments on our brief overview of current imaging orders by GPs in Australia. The article was intended to be of sufficient detail to give a perspective to other articles in the May issue of *AFP*, rather than to be a definitive research report. The article is an update on our comprehensive report on imaging orders in general practice which is available on the internet.[1] That report detailed a comprehensive literature review of GP imaging orders, a review of Australian, USA and other guidelines, and comparison of GP ordering with these guidelines. Because of space limitations, the reference was deleted from the article. The reader is referred to that report for a more detailed picture of GP imaging orders.

While more detailed clinical audit data can provide further insights into imaging orders by both GPs and specialists, such studies do not give a representative picture such as that provided by the BEACH study. In our reviews of the literature of general practice based studies[1] we have found the GPs adhere to guidelines where these are well supported, consistent with the variance between patients. The paper by Picano[2] quoted by the author does not shed any new light on the subject. I consider the implied broad criticism of GP imaging ordering contained in the letter not to be justified by the evidence.

Graeme Miller
AIHW Australian General Practice Statistics and Classification Centre
University of Sydney, NSW

References

1. Britt H, Miller GC, Knox S. Imaging orders by general practitioners in Australia 1999–00. AIHW Cat. No. GEP 7 Canberra 2001: Australian Institute of Health and Welfare, General Practice Series No 7. Available at www.aihw.gov.au/publications/index.cfm/title/6949.
2. Picano E. Sustainability of medical imaging. BMJ 2004;328:578–80.

ADDRESS LETTERS TO

The Editor
Australian Family Physician
1 Palmerston Crescent
South Melbourne Vic 3205
Australia

FAX 03 8699 0400

EMAIL afp@racgp.org.au

Breast cancer screening

The following letter and its reply are presented to illustrate some of the controversies that exist around screening. The letter was written in response to an article in *AFP*'s January/February 2006 issue that drew attention to the potential harms of screening. As GPs, we need to be attuned to both the patient's perspective and the epidemiologist's approach. Further correspondence on this topic is welcome.

Dear Editor

As breast cancer survivors, we strongly endorse the view that full and comprehensive information on the benefits and risks associated with cancer screening is essential. It is therefore disappointing to read Barratt's[1] analysis which patently fails to adhere to this mandate. The following comments are confined to our area of 'expertise' – breast cancer and ductal carcinoma in situ (DCIS).

Identifying the subgroup of women diagnosed with DCIS who will then go on to develop invasive breast cancer is, admittedly, fraught with uncertainty. Yet to claim as Barratt does that, 'we have to offer treatment to everyone and therefore screening must inevitably lead to overdetection and overtreatment', is not only simplistic, but a distortion of current evidence based practice. Her implicit portrayal of DCIS, as a single homogeneous and 'innocuous' condition is a fallacy. Two recent state based Australian reports[2,3] reveal that the incidence of high grade DCIS is greater than 50% in screening detected lesions. Furthermore, one recent study has also shown that the tumour marker most often associated with poor prognosis – HER2 – is present in 28% of DCIS oestrogen receptor positive cases.[4] In many cases, DCIS is thus far from 'innocuous'.

Most importantly, current Australian guidelines note that: 'The woman should be informed that... DCIS is treated somewhat differently from invasive breast cancer'.[5] In contrast to invasive disease these guidelines recommend that in the case of DCIS, chemotherapy is not indicated; the efficacy of tamoxifen and other hormone therapies remains 'uncertain', and that the 'absolute benefit of radiotherapy varies for each patient'. Potential treatment is determined on the basis of 'size, margins, nuclear grade, necrosis, architecture and calcification'.[5] These factors, taken together, should form the basis for further medical intervention, not merely the presence of DCIS. Hence, the purported link between overdetection and overtreatment is neither causal nor inevitable.

Barratt also asserts that 'up to 40% of middle aged women have evidence of DCIS'. What the reader is not told is that these figures are apparently based on one single study that features in the review cited by Barratt. The review in fact covers seven studies, one of which reported zero identification of DCIS. In addition, recent statistical reviews by BreastScreen Australia reveal that: 'The age standardised DCIS detection rate was 10.5 per 10 000 women screened for women in the target age group, and 10.0 per 10 000 screened for all women aged 40 and over'.[6] Admittedly, not all women screened in Australia use BreastScreen. However, we would suggest that with a 'penetration' rate of 57.1% of the target population, these figures are valid representations of total DCIS found through screening and nowhere near the 40% claimed by Barratt.

What is most disconcerting about the Barratt article is the use of language that we find pejorative. What can one say about the following sentence? 'While screening may deliver benefits, it always does harm'. Not only is such language scientifically unacceptable, but as women living with a prior diagnosis of invasive breast cancer, we are eternally grateful for the fact that screening and the subsequent range of interventions has helped not only extend, but in many cases, 'save' our lives. To suggest that screening does 'harm' because of false positives, or that recalls arouse undue anxiety, is both paternalistic and not supported by the evidence.[7] A diagnosis of invasive cancer is far more stress inducing than being recalled for a mammogram!

Women should demand full information before screening, but they must also be informed in a balanced and objective manner. We submit that Barratt's thesis fails this basic, commonsense approach.

Rosetta Manaszewicz
(on behalf of the Breast Cancer Action Group, Vic)

References

1. Barratt A. Cancer screening: benefits, harms and making an informed choice. Aust Fam Physician 2006;35:39–42.
2. Breast cancer and treatment in ACT and surrounding regions. Quality Assurance Project: 5 year report. Available at http://health.act.gov.au/c/health?a=sendfile&ft=p&fid=11–3–635048&sid=
3. BreastScreen Victoria. Annual statistical report, 2002. Carlton: BreastScreen Vic, 2004; p.36.
4. Collins LC, Schnitt SJ. HER2 protein overexpression in estrogen receptor positive ductal carcinoma in situ of the breast: frequency and implications for tamoxifen therapy. Mod Pathol 2005;18:615–20.
5. The clinical management of ductal carcinoma in situ, lobular carcinoma in situ and atypical hyperplasia of the breast. National Breast Cancer Centre, Camperdown: 2003; p.27.
6. BreastScreen Australia monitoring report. Canberra: Australian Institute of Health and Welfare, 2004; p.27.
7. Marie A, Ganott MD, Jules H, et al. Screening mammography: do women prefer a higher recall rate given the possibility of earlier detection of cancer? Radiology 2006;238:793–800.

Reply

Dear Editor

In responding to this letter, I would like to emphasise our agreement on the importance of providing evidence based information to the public and to clinicians about screening. However, we do have some relatively minor points of disagreement. In particular, I stand by my statement that: 'We have to offer treatment to everyone and therefore screening must inevitably lead to overdetection and overtreatment'. Based on epidemiological theory we can predict that screen detected disease will, on average, tend to have a better prognosis than symptomatic disease, and that screening will detect some disease which, if undetected, would not have caused symptoms within the person's lifetime.[1] In practice, overdetection (to varying degrees) has now been described in relation to prostate, breast, cervical, skin and bowel cancer, and neuroblastoma screening. The question is no longer whether overdetection and overtreatment occurs in cancer screening, but to what extent it occurs.[2–10] At present the methods for quantifying overdetection are not well established. Manaszewicz asserts that the harm of false positives is trivial compared to saving lives by screening but this misses the point. Overdetection and overtreatment of screen detected disease (not false positives or false negatives) will probably prove to be the most important harm of screening. It is not well

understood yet by health professionals and there is very little public awareness of it.[11]

Manaszewicz states that two BreastScreen reports show the incidence of DCIS is over 50% in screening detected lesions.[12,13] However, both reports include women who presented with symptomatic DCIS. The same concern applies to the paper by Collins et al;[14] their sample consists of 148 cases of DCIS, and they do not state whether these are clinically presenting or screen detected cases of DCIS. For these reasons, we should not assume that asymptomatic and clinically presenting disease will be similar in behaviour and prognosis. However, if we accept these data, it still means that about half of DCIS is not high grade, and as noted by the reports it is not known how much of this disease will lead to invasive disease within women's lifetimes. It is clear that DCIS is common within screening programs, representing 18% overall of all tumours found by BreastScreen.[13] Furthermore, 99.3% of women with DCIS underwent surgery (53.3% had only one operation, 40.1% two, and 5.8% had three operations),[12] and the mastectomy rate was 44.1%.[12] These data support my view that once diagnosed it is understandably difficult not to treat screen detected disease and that therefore overdetection by screening does lead to overtreatment. Treatment trials of screen detected cancers (of all types) are urgently needed, a point noted by the guidelines for treatment of DCIS.[15] These guidelines recommend treatment of DCIS because of the difficulty of predicting which women with DCIS will eventually develop invasive breast cancer.[15] Thus they support my statement that we must offer treatment to everyone with screen detected disease because of our current inability to accurately predict which screen detected cases will progress and within what timeframe.

The review I cited is of seven autopsy studies of women who died from causes other than breast cancer.[16] The median prevalence of DCIS was 8.9%, but the rates varied widely and appeared to be related to the level of scrutiny. The study that found no cases of DCIS examined nine slides per breast, whereas the two series (by the same investigators) with the highest rates examined 95 and 275 specimens per breast. I do not mean to suggest that mammography will find DCIS in up to 40% of women (it won't as it is not nearly as sensitive as 275 pathology slices), but that there is an enormous reservoir of 'cancer' in the population. The situation is very similar for thyroid cancer; indeed it has been estimated that if you examine thyroids carefully enough you can find thyroid cancer in virtually everyone.[17] The challenge is to find screening tests that pick up the cancers that matter without also detecting cancers that are not destined to bother people.

Finally, my statement that screening may deliver benefit but always does harm is perhaps unappealing, but it is accurate as is recognised by the UK National Screening Committee[18] and the US Preventive Services Taskforce.[19] Screening should only be introduced if there is good evidence that there will be net benefit to the population. There have even been examples of screening programs which have been withdrawn because they caused net harm (eg. infant neuroblastoma screening).[10,20]

Manaszewicz clearly feels that the benefits of breast cancer screening exceed the harms. Many women agree with her and in my view that is a very reasonable, evidence based conclusion. However, how women value the benefits and risks of mammography is a reflection of women's personal values and preferences, and varies between women. Other relevant factors such as risk of breast cancer, comorbid diseases, and competing health priorities, also vary between women. Therefore, in my view it is also reasonable and evidence based for some women to decide that the benefits do not outweigh the harm and to decline screening. We are currently trialling a decision tool for women aged in their 40s that presents evidence based information about the pros and cons of starting mammography screening. We invite any interested doctors to contact the study co-ordinator, Erin Mathieu, on 02 90367137 for more information.

Alexandra Barratt
University of Sydney, NSW

References

1. Morrison AS. Screening in chronic disease. 2nd ed. New York: Oxford University Press, p.23.
2. Draisma G, Boer R, Otto SJ, et al. Lead times and overdetection due to prostate specific antigen screening: estimates from the European Randomised Study of Screening for Prostate Cancer. J Natl Cancer Inst 2003;95:868–78.
3. Paci E, Duffy S. Overdiagnosis and overtreatment in service screening. Breast Cancer Res 2005;7:266–70.
4. Zahl PH, Strand BH, Maehlen J. Incidence of breast cancer in Norway and Sweden during introduction of nationwide screening: prospective cohort study. BMJ 2004;328:921–4.
5. Jonsson H, Johansson R, Lenner P. Increased incidence of invasive breast cancer after the introduction of service screening with mammography in Sweden. Int J Cancer 2005;117:842–7.
6. Welch HG, Schwartz LM. Woloshin S. Ramifications of screening for breast cancer: 1 in 4 cancers detected by mammography are pseudocancers. [Letter] BMJ 2006;332:727.
7. Raffle AE, Alden B, Quinn M, Babb PJ, Brett MT. Outcomes of screening to prevent cancer: analysis of cumulative incidence of cervical abnormality and modelling of cases and deaths prevented. BMJ 2003;326:901.
8. Robinson MH, Hardcastle JD, Moss SM, et al. The risks of screening: data from the Nottingham randomised controlled trial of faecal occult blood screening for colorectal cancer. Gut 1999;45:588–92.
9. Welch HG, Woloshin S, Schwartz LM. Skin biopsy rates and incidence of melanoma: population based ecological study. BMJ 2005;331:481.
10. Schilling FH, Spix C, Berthold F, et al. Neuroblastoma screening at one year of age. N Engl J Med 2002;346:1047–53.
11. Schwartz L, Woloshin S, Cox H, Fischoff B, Welch H. US women's attitudes to false positive mammography results and detection of ductal carcinoma in situ: cross sectional survey. BMJ 2000;320:1635–40.
12. Breast cancer and treatment in ACT and surrounding regions. Quality Assurance Project: 5 year report. Available at http://health.act.gov.au/c/health?a=sendfile&ft=p&fid=11–3–635048&sid=
13. BreastScreen Victoria. Annual statistical report, 2002. Carlton: BreastScreen Vic 2004; p.36.
14. Collins LC, Schnitt SJ. HER2 protein overexpression in estrogen receptor positive ductal carcinoma in situ of the breast: frequency and implication for tamoxifen therapy. Mod Pathol 2005;18:615–20.
15. The clinical management of ductal carcinoma in situ, lobular carcinoma in situ and atypical hyperplasia of the breast. Camperdown: National Breast Cancer Centre, 2003; p.27.
16. Welch HG, Black WC. Using autopsy series to estimate the disease 'reservoir' for ductal carcinoma in situ of the breast. Ann Intern Med 1997;127:1023–8.
17. Welch HG. Should I be tested for cancer? Maybe not and here's why. California: University of California Press, 2004;81.
18. Gray JA. The evolution of screening. Pharmacoepidemiology & Drug Safety 2001;10:49–54.
19. US Preventive Taskforce Ratings. Available at www.ahrq.gov/clinic/3rduspstf/ratings.htm [Accessed 5 May 2006].
20. Bessho F. Where should neuroblastoma mass screening go? Lancet 1996;348:1672.

afp **CORRESPONDENCE** email: afp@racgp.org.au