Is histological examination of tissue removed by general practitioners always necessary? Before and after comparison of detection rates of serious skin lesions

Adam Lowy, Diane Willis, Keith Abrams

Department of
Epidemiology and
Public Health,
University of
Leicester, Faculty of
Medicine, Leicester
LE1 6TP

Adam Lowy,
lecturer in
epidemiology
Keith Abrams,
senior lecturer in
medical statistics

Greenwood
Institute for Child
Health, Leicester
LE3 0QU

Diane Willis,
research associate

Correspondence to:
Dr Lowy
agjl1@le.ac.uk

BMJ 1997;315:406-8

Abstract

Objectives: To examine whether histological examination of all tissue removed by general practitioners in minor surgery increases the rate of detection of clinically important skin lesions, and to assess the impact of such a policy on pathologists' workload.

Design: Before and after comparison.

Setting: Stratified random sample of 257 general practitioner partnerships from the catchment areas of 19 English pathology laboratories.

Subjects: Tissue removed in minor surgery by general practitioners during the control period (September 1992 to February 1993) and intervention period (September 1993 to February 1994).

Intervention: General practitioners referred to their local pathology laboratory all solid tissue removed in all minor surgery, irrespective of their previous policy.

Main outcome measures: Numbers of specimens referred for histology by general practitioners during intervention and control periods; numbers of primary malignant melanomas, non-melanoma malignancies, premalignant lesions, and benign lesions.

Results: 257/330 partnerships participated (response rate 78%). During the intervention period 5723 specimens were sent, compared with 4430 during the control period. The referral rate increased by an estimated 1.34 specimens per 1000 patient years (95% confidence interval 0.93 to 1.76, $P < 0.001$). General practitioners sent 204 specimens that were malignant (including 16 malignant melanomas) in the control period and 188 that were malignant (including 15 malignant melanomas) during the intervention period (change in total number of malignancies, -1.0 per 100 000 patient years (-5.9 to 3.8 , non-significant)).

Conclusions: The intervention was associated with a substantial increase in laboratory workload, all of which was accounted for by increases in non-serious lesions. This observation should be taken into account when considering the merits of a policy requiring histological examination in every case.

Introduction

Since the changes to general practitioners' contracts in 1990¹ the volume of minor surgery by general practitioners has increased substantially.² Around 40% of lesions excised by general practitioners are not referred to a pathologist.^{3,4} Several researchers have reported diagnostic errors and incomplete excision of malignant lesions by general practitioners^{5,9} and have recommended mandatory pathological examination, a proposal supported by the Royal College of General Practitioners and other professional bodies.¹⁰

Whether this policy would benefit patients is unclear. Research has been restricted to specimens that general practitioners have chosen to send, undoubtedly introducing a bias towards "problematic" lesions. Nothing is known about the histological nature of lesions that general practitioners discard. Most are clinically diagnosed as ingrown toenails, foreign bodies, skin tags, warts, ganglia, cysts, and other benign lesions,⁴ so it is possible that few serious lesions are currently discarded. Although histological examination cannot harm the patient and might help, this alone does not necessarily constitute grounds for investigation, a principle that is widely accepted in other areas of clinical practice (*x* ray examinations, for example, are not automatically performed after head injury¹¹ or ankle inversion¹² because this approach is acknowledged to result in wasteful overinvestigation). Paraskevopoulos and colleagues questioned the need to examine all tissue excised during minor operations in hospital, concluding that the risks of missing an important diagnosis seemed exceptionally small for what appeared to be a considerable saving in time and money.¹³

General practitioners probably discard about 250 000 excision specimens annually;⁴ at about £18 each³ it would cost £4.5m a year to examine them all. The Royal College of Pathologists recommends that a consultant pathologist examines 2000-3000 surgical specimens a year.¹⁴ Although specimens from minor surgery are often straightforward to examine, Paraskevopoulos and colleagues suggest that 5000 such specimens would represent a year's work for a consultant.¹³ It is not known whether the benefits of examining histologically the specimens that general practitioners discard would outweigh the cost in

pathologists' time (or indeed whether any benefit would result),¹⁵ and we examined what the impact of such a policy would be.

Methods

We randomly selected 24 pathology laboratories in England.¹⁶ Three pathologists refused to take part, one because of impending retirement and two because of concern about workload. We also randomly selected, in the catchment area of each laboratory, 8-18 general practitioner partnerships offering minor surgery. Partnerships were excluded if they performed fewer than four excisions a month or if they had merged or split, changed the number of partners, or extended or restricted their provision of minor surgery since September 1991 (or anticipated doing so before the end of the study).

The practices agreed to obtain a histological diagnosis from their usual laboratory on all solid tissue removed by any minor surgery (including cautery and diathermy) from 1 September 1993 to 28 February 1994. Histological diagnosis, date of surgery, and practice code were collected from pathology reports for all specimens sent by the practices during the intervention period and during a 6 month control period (1 September 1992 to 28 February 1993) before the intervention.

Two of the 21 areas were excluded because of problems with their databases. The effects of the intervention were estimated as differences in incidence; when we found evidence against a uniform intervention effect this was taken account of in stratified random-effect analyses.

Results

Of 330 partnerships in the 19 areas, 257 (response rate 78%) took part (914 general practitioners, 1.6 million person years, and 10 153 specimens). The overall referral rate increased by 29% (table 1). Although the impact on referral rates varied significantly between the areas ($\chi^2 = 162$, $df = 18$, $P < 0.001$), this appeared to be due simply to the large variation between practices, rather than to a true area effect. A random-effect analysis, in which the underlying intervention effect was considered to vary between practices, showed an average increase in referrals of 1.34 specimens per 1000 person years (95% confidence interval 0.93 to 1.76).

The impact of the intervention on the detection of malignant and premalignant lesions was negligible (table 2), with the small falls in malignant lesions probably being the result of chance. The bulk of the increased number of referrals comprised viral warts, seborrhoeic keratoses, and ingrown toenails (1729 in the control period, 2886 during the intervention; difference in detection rate 1.4 lesions per 1000 person years (95% confidence interval 1.3 to 1.6, $P < 0.001$); the increase in other benign lesions was smaller (2409 v 2720; 0.38 (0.21 to 0.56, $P < 0.001$).

Discussion

The broad geographical coverage and the high response rate suggest that the study practices were representative of practices throughout England that

Table 1 Referral rates of tissue specimens sent by general practitioners in intervention and control periods

Period	No of specimens referred	Rate per 1000 person years	Adjusted rate difference (95% CI)
Control period	4430	5.49	1.34 per 1000 person years (0.93 to 1.76)*
Intervention period	5723	7.08	

* $P < 0.001$.

offer minor surgery; this is supported by the finding that the proportion of referred lesions that were malignant was closely similar to that found in other studies.⁶⁻⁸

The increase in the number of pathology referrals is unlikely to reflect an increase in the number of procedures because the study periods were close together and because we excluded expanding or contracting partnerships; moreover, most practices had reached their quota limits well before the start of the control period, and the quota remained unchanged throughout the study. The increase in the number of referrals is unlikely to be the result of a move away from ablating lesions to excising them, because the general practitioners agreed not to excise lesions that they would normally treat with ablation.

Increases in the number of specimens sent by general practitioners have already placed considerable burdens on laboratories.¹⁷ The further increase that occurred in this study (500 additional specimens per year in a typical laboratory) would not produce "laboratory chaos," which one author has predicted,¹⁸ but it is substantial. Two pathologists requested early termination of the intervention, even though only a small proportion of local general practitioners were participating. If all general practitioners started to refer every lesion they excised, many laboratories would probably have difficulty absorbing the resulting workload.

The gravest concern about general practitioners' selective use of histology is that some malignant melanomas that are incompletely excised might be missed. We saw no increase in the detection of melanoma, but the numbers were small and the 95% confidence interval was correspondingly wide. Although we observed no increase in detection, a small increase cannot be ruled out if the intervention were applied nationally. When considering whether general practitioners should have to refer all excised tissue for histological diagnosis, policymakers should balance the potential of such a policy to reduce morbidity and mortality associated with melanoma against alternative service developments with the same aim. MacKie and Hole reported that public education and the provision of pigmented-lesion clinics increase the detection of melanoma, including increased detection of lesions less than 1.5 mm thick,¹⁹ at which stage the five-year survival is over 90%; 1 in 22 lesions referred to their

Table 2 Malignant and premalignant skin lesions detected in control and intervention periods

Type of lesion	Control period	Intervention period	Detection rate difference (lesions/million person years (95% CI))
Premalignant lesions	91	98	9 (-25 to 42)
Malignant lesions:	204	188	-20 (-68 to 28)
Non-melanoma malignancy	188	173	-18.6 (-65 to 28)
Malignant melanoma	16	15	-1.2 (-15 to 12)
All malignant and premalignant lesions	295	286	-11.1 (-70 to 47)

Key messages

- Requiring general practitioners to refer all tissue for histological examination resulted in a substantial increase in laboratory workload
- No corresponding increase was observed in detection of clinically important lesions
- As a means of increasing detection of serious skin pathology, requiring general practitioners to send a tissue specimen whenever they excise a lesion is unlikely to be cost effective

pigmented-lesion clinic were malignant melanomas, a remarkably high proportion. This approach seems to offer far greater promise as a means of reducing mortality and morbidity associated with melanoma than even the most optimistic interpretation of the result of our study.

Conclusion

This multicentre study showed no increase in detection of clinically important lesions, suggesting that general practitioners successfully distinguish inconsequential from potentially serious lesions and make appropriate use of histopathology services. General practitioners should continue to refer specimens when they have even a slight suspicion that the lesion may be serious. The appropriateness of general practitioners' use of histological services could be further improved through guidelines²⁰ and communication with pathologists, but requiring general practitioners to refer everything they excise is unlikely to be cost effective.

Funding: This research was funded by a grant from the research and development division of the Department of Health.

Conflict of interest: None.

- 1 Department of Health, Scottish Home and Health Department, Welsh Office. General practice in the National Health Service, the 1990 contract. The government's programme for changes to general practitioners' terms of service and remuneration systems. London: HMSO, 1989.
- 2 Lowy A, Brazier J, Fall M, Thomas K, Jones N, Williams B. Minor surgery by general practitioners under the 1990 contract: effects on hospital workload. *BMJ* 1993;307:413-7.
- 3 O'Cathain A, Brazier JE, Milner A, Fall M. The cost-effectiveness of minor surgery in general practice: a prospective comparison with hospital practice. *Br J Gen Pract* 1992;42:13-7.
- 4 Lowy A, Brazier J, Fall M, Thomas K, Jones N, Williams B. Quality of minor surgery by general practitioners in 1990 and 1991. *Br J Gen Pract* 1994;44:364-5.
- 5 Whimster WF, Leonard RA. Surgical pathology and general practice: send all specimens for histopathological examination. *BMJ* 1991;303:1149-50.
- 6 McWilliam LJ, Knox F, Wilkinson N, Oogarah P. Performance of skin biopsies by general practitioners. *BMJ* 1991;303:1177-8.
- 7 Williams RB, Burdage AH, Lewis Jones S. Skin biopsy in general practice. *BMJ* 1991;303:1179-80.
- 8 Hillan KJ, Johnson CP, Morton R. Effect of general practitioner contract on referral of specimens for histological examination. *BMJ* 1991;303:1180.
- 9 Stephenson T. Excised human tissue: seek the truth or burn the evidence? *Br J Hosp Med* 1992;48(1):10-2.
- 10 General Medical Services Committee, the Royal College of General Practitioners in collaboration with Royal College of Surgeons of England, Royal College of Surgeons of Edinburgh, British Society for Dermatological Surgery, Joint Committee on Postgraduate Training for General Practice. *Minor surgery in general practice: guidelines*. London: RCGP, 1996.
- 11 Briggs M, Clarke P, Crookard A, Cummins B, Galbraith S, Garfield J, et al. Guidelines for initial management after head injury in adults. *BMJ* 1984;288:983-5.
- 12 Brooks SC, Potter BT, Rawley JB. Inversion injuries of the ankle—clinical assessment and radiographic review. *BMJ* 1981;282:607-8.
- 13 Paraskevopoulos JA, Hosking SW, Johnson AG. Do all minor excised lesions require histological examination? *J R Soc Med* 1988;81:583-4. (Discussion paper.)
- 14 Royal College of Pathologists. *Medical and scientific staffing of National Health Service pathology departments*. London: RCP, 1972.
- 15 Lowy A, Fall M, Brazier J. Skin biopsies by GPs [letter]. *Br J Gen Pract* 1993;43:478.
- 16 O'Shea JP, ed. *Association of clinical pathologists' yearbook 1992*. London: Stroudgate Publishing, 1992.
- 17 Shorrock K. Use of histopathology services by general practitioners: recent changes in referral practice. *J Clin Pathol* 1993;46:989-92.
- 18 Slater D. Screening and the 1990 contract. *BMJ* 1990;300:1074.
- 19 MacKie R, Hole D. Audit of public education campaign to encourage earlier detection of malignant melanoma. *BMJ* 1992;304:1012-5.
- 20 Cox NH, Wagstaff R, Popple AW. Using clinicopathological analysis of general practitioner skin surgery to determine educational requirements and guidelines. *BMJ* 1992;304:93-6.

(Accepted 19 June 1997)

A memorable patient

Death in the Scottish Highlands

So many tales to tell; but I was prompted by the *BMJ* editorial on "Learning from asthma deaths" (*BMJ* 1997;314:1427-8) to recall a harrowing incident during the summer, in the late 1950s. It was associated with a wailing howl of maternal anguish which will forever haunt me. I had only recently graduated and was working as a locum in the Scottish Highlands. I knew all about asthma. After all one of my general practitioner tutors and mentor had himself suffered from it. He was never without his rubber bulb atomiser of isoprenaline.

At around two o'clock I was called from my bed in the local hotel to attend a 16 year old girl who "was having an asthma attack." She was an attractive young girl who regularly helped with teas at the local cricket club. She lived a good 10 miles or so away in a small country village, the location of which I had first to find on my map. On the way, I can well remember feeling somewhat peeved at such a call out. Would she have had the forethought to have taken one of her tablets containing phenobarbitone? Would I be expected to give her an injection of subcutaneous adrenaline, which could result in her becoming medically dependent during future episodes? Why couldn't she wait until the morning? Was her mother overprotective? After all, we had been taught—"get rid of the mother, and you'll cure the child's asthma."

By now I had arrived in the village but how to find the house at that time of night? It was easy, oh so easy. There was the most spine chilling, blood curdling, uninhibited wailing lament coming from one of the cottages. On the bedroom floor was the young girl, pulseless and waxen. On my arrival her mother flew at me beating her fists against me to "do something." It was many years before the routine use of mouth to mouth resuscitation and I was able only to uselessly inject the girl's lifeless body with the adrenaline, which I had intended not to use. It seemed that her mother had gone to the local telephone box and on her return had found her daughter on the floor, dead. She was grateful that I had done all that I could, and so the village mourned and the practice got on with its ministry.

In the subsequent 40 years, I've been almost as intimately involved in two other cases of sudden death from asthma, each in young women, and, despite having aimed to keep up with the advances in medical care of those who suffer from asthma, I now more soberly and humbly appreciate that I know so very little about the disease.

Jim McCracken, recently retired general practitioner in Nottingham