PRACTICE OBSERVED

Practice Research

Diagnosing cancer in general practice: when is cancer suspected?

MAGNE NYLENNA

Abstract

Of 10 278 encounters with patients recorded by 33 general practitioners in a defined Norwegian population during a two month period, 429 (4.2%) were classified as resulting in a follow up for suspected cancer. The patient's fear of cancer was the most important indicator of suspicion of cancer among the doctors. Patients who consulted for digestive and gynaecological problems were most frequently suspected of having cancer. Comparing the pattern of suspicion of cancer with the incidence of cancer in the area showed a relative oversuspicion in young patients and women.

Introduction

There is general agreement that cancer should be diagnosed as early as possible and treatment started promptly, and thereby, it is hoped, improve the prognosis. The general practitioner is usually the physician of first contact for the patient and represents the portal of entry to the health care system for most patients. He or she will be responsible for the early detection of cancer, and a short delay in recognising neoplastic disease has even been used as a criterion for measuring quality of care in general practice.¹ Medical diagnosis is a matter of probability, even for cancer.²

Making a diagnosis entails at least two distinct processes: thinking of the diagnostic possibilities and working through them to see which fits the clinical facts best. Clinicians normally generate a few diagnostic hypotheses, rarely more than five, at an early stage, and these hypotheses guide further inquiry.³ One or more of the hypotheses will be tested by clinical examination and further investigations.

Department of General Practice, University of Oslo, Frederik Stange gate 11/13, 0404 Oslo 2, Norway
MAGNE NYLENNA, MD, research fellow

When cancer is among the possible diagnoses investigations after the encounter between doctor and patient are usually initiated. The crucial question for the doctor is whether to follow up with an investigation for cancer or not.

The aim of this study was to describe and analyse the extent and pattern of suspicion of cancer in general practice.

Patients and methods

During September and October 1983 every face to face encounter between doctor and patient in nine rural municipalities in western Norway with a population of 29 420 inhabitants was recorded. All 33 general practitioners (three women and 30 men, mean age 33.4 years, range 26-54 years) who practised in the area during this period participated in the study.

Reliable and valid data were obtained by making the recording as complete as possible and by ensuring that the recording itself did not influence the general practitioner's behaviour during the study. This was monitored by indirect means which showed that the effect of the study itself was small.

The patient's reason for the encounter was recorded according to the WHO Reason for Encounter Classification,⁴ which was used in a simplified version.⁵ This is a two dimensional classification system in which the patient's reason for the encounter is classified according to the type of problem and according to the body system associated with that problem. The general practitioner also recorded whether the patient expressed fear of cancer, either openly or indirectly, and whether the patient was followed up for suspected cancer. A follow up was defined as action taken beyond the initial encounter because cancer was suspected.

The general practitioner assessed both the strength of the suspicion of cancer and the patient's influence on the follow up on visual analogue scales. The difference between the patients who were suspected of having cancer and the others were studied in more detail in patients who sought medical care for the first time for a particular problem. First contacts were selected for this analysis to avoid the influence of previous decisions. To find a way of classifying the patients who were suspected of having cancer a multivariate method was used. The relative contribution of different variables (age, sex, fear of cancer, and reason for encounter) was analysed by using Fisher's linear discriminant model.⁶

When analysing the pattern of suspicion of cancer all patients who were suspected of having cancer (both first and later contacts) were included to

0.05 ($p < 0.01$). There was a tendency to suspect cancer more strongly in patients who expressed a fear than in others, but this difference was not significant.

Table V gives the distribution of diagnoses for the patients with suspected cancer compared with the distribution of diagnoses for cases of cancer diagnosed in the study area during the five years 1978-82. For men, the distribution according to system corresponded well, and no significant differences were found. For women, there was a significant oversuspicion of gynaecological cancer ($p < 0.05$). A corresponding undersuspicion was found for breast cancer and cancer of the urinary tract and the haematopoietic system. This undersuspicion remained after excluding all gynaecological cases from the analysis.

The figure shows the cumulative age distribution of patients with suspected cancer compared with that of the recently diagnosed cases of cancer. Though cancer was relatively oversuspected in the younger patients

Cumulative age distribution (% of suspected cases and diagnosed cases of cancer by sex)

and correspondingly undersuspected in the elderly patients of both sexes, this shift was much greater for women than men. Some of this difference was caused by the large number of young women who were suspected of having gynaecological cancer, but even when suspected gynaecological cancer is excluded 27% of women suspected of having cancer were aged under 40 and 2% aged over 70 against 21.0% and 36.1% respectively of men.

Discussion

As expected, the suspicion of cancer increased with the age of the patient. Many chronic diseases occur mainly among the elderly people, of all new cases of cancer in Norway in 1983 only 6.4% were reported in patients under 40, whereas three quarters were in patients over 60.⁷

The sex difference, with a suspicion rate one and a half times as high in women than in men, is striking and contrasts with the overall incidence of cancer in Norway, which in fact is slightly higher in men than women.⁸ This sex difference and the known difference in

contact rates between men and women with their general practitioners makes the predominance of women among patients suspected of having cancer even more striking.

Both age and sex were outweighed by the patient's fear of cancer in the doctor's classification of suspicion of cancer. In a multivariate analysis fear of cancer was the most important single factor. Even though 40% of patients suspected of having cancer were misclassified according to the discriminant model, the finding of an apparent error rate of only 6% shows that the factors selected were adequate. As doctor factors were not even included in the analysis, most of the interdoctor variance must have been caused by the patient factors studied. It should be noted that the apparent error rate is usually an overoptimistic estimate. Because of the large number of patients in this study, however, the apparent error rate is close to the estimated actual error rate, which gives the estimated future proportion of misclassified patients.

Fear of cancer is common among patients in general practice.⁹ The strong correlation between the patient's fear of cancer and the doctor's suspicion of cancer may have two explanations: either that the doctor finds the patient's fear so important that it requires further investigation or that this fear is usually so relevant that in fact the evaluation of symptoms and signs by both patient and doctor is similar. The association between fear of cancer and the patient's influence on the follow up favours the first explanation, whereas the lack of an inverse relation between the patient's fear of cancer and the strength of the doctor's suspicion favours the second.

When the reasons for seeking an encounter were considered greater differences in the frequency of suspicion of cancer were found. The suspicion rate was high when patients presented symptoms associated with the "severe warning signals" category, such as a palpable lump, bleeding, or changes in bowel habits, but since these reasons count only for a minority of all contacts most follow ups were made on the basis of other and less specific symptoms and complaints. The digestive tract and the female genital system showed a high rate of suspicion of cancer. Cancer related to these systems is common, and the general practitioner makes a special contribution to the diagnosis of both gynaecological¹⁰ and gastrointestinal cancer.¹¹⁻¹³

Recording the first step in the diagnostic process and comparing the pattern of suspicion with the known incidence in the population by age, sex, and diagnostic subgroup is a basis for discussing differences and similarities. The method represents a simple model for evaluating the working process in general practice. This method does not tell us whether the extent of suspicion of cancer is adequate or not, but the comparison shows a relative oversuspicion of cancer for women and young patients and a relative undersuspicion for men and older patients.

The consequences of overlooking a cancer are thought to be greater for a young patient than for an old patient, and this may be one of the reasons for the lower threshold for carrying out further investigations on young patients. Observations concerning the relation of stage of disease to age at diagnosis indicate that it is particularly important to make an early diagnosis in the young.¹⁴

Most of the sex difference was caused by the high frequency with which women suspected gynaecological cancer. It must be emphasised that this is found even when routine cervical smears are excluded. While a striking correspondence of distribution of cancer by organ system between suspected cases and diagnosed cases of cancer was found for men, gynaecological cancer was relatively oversuspected and cancer of the breast, urinary tract, and blood were relatively undersuspected in women. For men, this may indicate that particular cancer types are more serious or have such therapeutic implications that an increased awareness is required.

The high frequency of suspected gynaecological cancer may have been caused by several factors. (a) Young women are conscious of the importance of early detection of gynaecological cancer. (b) Public awareness of these diseases is great, and screening programmes remind women of the possible risks. (c) A broad spectrum of symptoms is associated with gynaecological cancer, which may partly explain the low frequency of suspected cancer of the urinary tract. (d) Access to a second opinion is easy, and even though no standard programme for further investigation exists, the

make the analysis as complete as possible. The Cancer Registry of Norway provided a complete list of the incidence of cancer and the prevalence in the study population (Cancer Registry of Norway, personal communication, 1986), and the distribution of all cases of suspected cancer was compared with the incidence of cancer in the population by age, sex, and diagnosis. Statistical analysis was carried out by the χ^2 test and Student's t test, unless otherwise noted.

Results

A total of 10 278 encounters (59% women and 41% men) were recorded, of which 429 (4.2%) were classified as resulting in a follow up for suspected cancer.

FIRST CONTACTS

In 5157 (50.2%) encounters the patients had made the first medical contact for that problem: 47.3% for women and 54.4% for men ($p < 0.001$). Suspicion of cancer was recorded in 226 (4.4%) of the first contacts, more often among women than men (5.1% against 3.4% ($p < 0.01$)). The patients who were suspected of having cancer were on average older than the others: 50.1 years against 35.4 years ($p < 0.01$). Fear of cancer was much commoner in the patients who were suspected of having cancer than in the others ($p < 0.001$) (table 1). Tables II and III compare the frequency of suspicion of cancer with the patient's reason for the encounter.

TABLE 1—Number (%) of patients suspected or not suspected of having cancer according to their fear of cancer. First contacts only

	Patients suspected of having cancer	Patients not suspected of having cancer
No fear of cancer	90 (19.8)	470 (19.3)
Fear of cancer expressed by the doctor	65 (28.8)	104 (2.1)
Fear of cancer openly expressed	66 (30.5)	113 (2.3)
Unknown	2 (0.9)	11 (0.5)
Total	226 (100)	491 (100)

TABLE II—Frequency of doctor's suspicion of cancer according to the patient's reason for encounter (type of problem). First contacts only

Reason for encounter	No. of encounters	No. of encounters for suspected cancer	Percentage suspected of having cancer
Symptoms	92	37	40.2
Palpable lump or tumour	184	42	22.8
Pain	21	9	42.9
Fatigue	21	9	42.9
Changes in bowel habit	21	9	42.9
Changes in bladder habit	21	9	42.9
Skin changes	267	16	6.0
Other unspecified symptoms*	1741	135	7.8
Causes of cancer	369	24	6.5
Diagnosis, preventive procedure	7	3	42.9
Treatment	2	1	50.0
Test results	280	2	0.7
Administrative procedure	11	1	9.1
Other unspecified	95	2	2.1
Diagnosis, disease control	2	1	50.0
Total	5157	226	4.4

*Patients with weight loss are included, one of which was suspected of having cancer.

By analysing the different factors thought to be important for the doctor's classification of suspected cancer the contributed value of each factor was estimated. Taking all body systems together the most important factor was whether the patient expressed a fear of cancer or not. This factor was given the value of 1.0, and the contribution of the other factors is shown in table IV. This was based on a discriminant function which classified the patients with an apparent error rate of 6% (40% of the patients suspected of having cancer were classified as not suspected and 4% of those not suspected were classified as suspected).

TABLE III—Frequency of doctor's suspicion of cancer according to the patient's reason for encounter. First contacts only

Reason for encounter	No. of encounters	No. of encounters for suspected cancer	Percentage suspected of having cancer
General and unspecified	448	18	4.0
Head, blood forming organs	11	47	15.1
Diagnosis	12	1	8.3
Eye	131	1	0.4
Ear	11	6	54.5
Circulatory	208	1	0.4
Musculoskeletal	114	6	5.3
Neurological	128	2	1.6
Perceptual	119	1	0.8
Respiratory	426	12	2.8
Endocrine, metabolic, and nutritional	31	2	6.5
Urinary	179	13	7.3
Female genital system and breast	52	69	131.0
Male genital system	14	6	42.9
Social problems	20	2	10.0
Unknown	14	1	7.1
Total	5157	226	4.4

TABLE IV—Relative contribution of factors in classifying patients as suspected of cancer. All body systems together. First contacts only

Factor or variable	Finding the index suspected of cancer	Estimated value
Fear of cancer	Openly expressed	1.0
Sex	Female	0.6
Symptoms v non-symptoms	Symptom or complaint	0.2

TABLE V—Number of cancers suspected by general practitioners in September and October 1983 compared with number diagnosed in 1978-82

Diagnosis (ICD No.)	Female	Male
Buccal cavity, pharynx (140-148)	2	1
Digestive organs (150-159)	26	67
Colon, rectum (153-154)	22	37
Respiratory system (160-169)	11	91
Breast and genital organs (170-179)	111	91
Female only (170-179)	26	57
Male only (170-179)	85	34
Urinary tract (180-185)	7	15
Other unspecified (190-199)	71	47
Lymphatic and haematopoietic tissues (200-207)	4	8
Total	252	250

The relative contribution of the different factors varied with the body system. For patients whose reason for the encounter was associated with the gastrointestinal tract, age was the most important factor, and men were more often suspected of having cancer than women.

The interdoctor variation of suspicion of cancer ranged from 0 to 8.7%.

ALL ENCOUNTERS

The 429 encounters for suspected cancer were with 382 individuals, of whom three women were suspected of having two different cancers each. This gives a total of 385 suspected cancers, 252 in women and 133 in men. 5.9% of the women and 4.4% of the men were suspected of having cancer ($p < 0.01$). A higher proportion of women was suspected in all age groups. Of the patients suspected of having cancer, 57.5% expressed a fear of cancer, and the contribution of the other factors is shown in table IV. This was based on a discriminant function which classified the patients with an apparent error rate of 6% (40% of the patients suspected of having cancer were classified as not suspected and 4% of those not suspected were classified as suspected).

referral procedure and defined responsibility of gynaecologists make it easy for the general practitioner to initiate a follow up.

It is interesting to note the low threshold of suspicion for gynaecological cancer among young women in the light of the positive relation between the advanced stage of the tumour and the advanced age of the patient at the time of diagnosis that has been shown for some of the commonest cancers in women.¹⁵ A low threshold of suspicion of gynaecological cancer in young women may be one of the reasons for the favourable distribution by stage of these tumours in young age groups. There was, however, no general trend in this study towards high suspicion rates for tumours known to be diagnosed at an early stage. The relative undersuspicion of breast cancer is an example. As suspicion of cancer was defined as a follow up beyond the initial encounter every suspicion of cancer that was rejected during the encounter was excluded. This is possibly of more relevance for breast cancer than for other malignancies.

A rational level of alertness for cancer should be found after balancing the possible consequences of treatment after an early diagnosis against the complications and costs of follow up for suspected cancer. To evaluate the relevance of the follow up of suspected cancer and the level of alertness among the general practitioners a prospective study was carried out as a second part of this survey.¹⁶

References

1. Eddy DM. Finding cancer in asymptomatic people. *Cancer* 1983;53:240-5.
2. Carter S, Myers ML, White PL. Who we miss and who we don't. *Am J Surg* 1978;137:421-5.
3. American Cancer Society. *ACS report on the cancer-related death toll*. 1984; 100 pp.
4. Bostrom L, Sundberg L, Lofgren S, Olsson L. *Medical problems arising. An analysis of clinical reasoning*. Cambridge: Massachussetts: Harvard University Press, 1978.
5. Sorensen L. The diagnosis and treatment of cancer in a general practice. *J Fam Pract* 1984;19:124-7.
6. Jonsson S. Diagnostic delay in neoplasms. *Br J Clin Oncol* 1973;10:238-43.
7. Lubin JH, Lashin LR. *Neoplasms*. Philadelphia: WB Saunders, 1979; 108-21.
8. Cox RB. The GP and the cancer patient. *Ann of Pharm Ther* 1978;17:57-68.
9. Haglund B. *Tumour research and diagnosis*. St. Louis: Churchill Livingstone, 1983.
10. Elmore AG, Schottenfeld LS, Speroff LA, et al. *Medical problems arising. An analysis of clinical reasoning*. Cambridge: Massachussetts: Harvard University Press, 1978.
11. Nylen M. The doctor's responsibility in the detection and treatment of gynaecological cancer. *Br J Clin Oncol* 1983;12:154-62.
12. Meads S. The WHO reason for encounter classification. *WHO Chron* 1981;37:154-62.
13. Nylen M. Why do we miss patients in our consultations? *Journal of Primary Health Care* 1983;1:3-12.
14. Haddad D. *Diagnosis and treatment*. New York: Wiley, 1981.
15. The Cancer Registry of Norway. *Incidence and mortality in Norway 1981*. Oslo: The Cancer Registry of Norway, 1983.
16. Nylen M. A study of cancer among patients in general practice. *Journal of Primary Health Care* 1984;2:24-6.
17. Fidler IJ. Role of the general practitioner in the detection and treatment of gynaecological cancer. *Primary Care* 1983;11:11-29.
18. Williams PL. The responsibility of the family physician in the detection of gynaecological cancer. *Br J Clin Oncol* 1983;12:154-62.
19. Macdonald DB. A study of general practice of the symptoms and signs patterns in the diagnosis of gynaecological cancer. *Br J Clin Oncol* 1979;18:723-7.
20. Nylen M. 113. *Medical problems arising. An analysis of clinical reasoning*. New York: Springer, 1984; 100 pp.
21. House DE, Hays RD. A study of general practice of the symptoms and signs patterns in the diagnosis of gynaecological cancer. *Br J Clin Oncol* 1979;18:723-7.
22. The Cancer Registry of Norway. *Incidence and mortality in Norway 1981*. Oslo: The Cancer Registry of Norway, 1983.
23. Nylen M. Diagnosing cancer in general practice from symptoms to certainty. *Br Med J* in press.

Accepted 16 May 1986

100 YEARS AGO

The use and abuse of the London season is a subject of vast importance. When it is considered what an unusual strain is borne by those who systematically "do" their season, it is a matter of no small surprise that so little illness results from their exertions. Nevertheless, when we contemplate the faded faces and disappointed expressions of those who are to be found at the railway stations after the conclusion of the Eton and Harrow match, we cannot but conclude that some of Nature's most potent laws have been rudely violated during these two or three months of so-called pursuit of pleasure. Take any ordinary London dissipation in the hot weather, and ask: what does it mean physiologically? It often implies a subsequent loss of strength, a sensation of fatigue, malaise, loss of temper, and irritability. The inhalation of carbonised, in place of oxygenated air, involves a readjustment of the pulmonary apparatus. Hence, an extra amount of work is thrown upon the heart, doing its best to force on the blood a large, which is retarded by the stagnation in front. Hence, again, less energy of the heart to supply the locomotor apparatus. Thus fatigue, produced by deficient blood supply, and also by deteriorated quality of that fluid, is the result. The proper rate of exchange of tissue is delayed. Hence, accumulations of urea, bile, and other secretions or excretions, which are normally got rid of as soon as their duties have been performed, but which now are unable to "move on." Hence, also, the indescribable feeling of fatigue, as opposed to being tired after healthy exertion, that feeling which renders a man unable to take exercise, which he has the inclination to do so, which makes him cross and irritable, which renders his special senses so acutely sensitive, that a very slight noise, a very bright light, a very faint perfume of fresh flowers, are regarded by him as personal insults. Not the least important element in the causation of fatigue during the London season, it is found in the exertion undergone by the muscles of the eye, in the pursuit of called "light-swinging." Take, for instance, the Royal Academy. Supposing a person looked at 500 out of the 1,000 or odd articles, and between each inspection, glanced down at his catalogue to find what it was all about. This would involve 1,000 eye-movements, not to mention the upper and lower neck, and the more complicated, but equally necessary, intricate muscles. Then, again, in addition to the enormous energy expended in this movement, we have to consider the intellectual, the emotional, and the volitional functions, which are actively called into play. It has been said by an eminent teacher of elocution, that, in public speaking, we have three things to do—to stand, to think, and to speak. The devotee to art has to stand, to think, and to sweat; and it is only by the perspiration expended in his researches, that he is enabled to carry out enough information to hold his own society during the London season. We see, indeed, the race is to the swift, and the battle to the strong, if we are only to pursue, even in moderation, the temptations to fatigue which are so alluringly attractive to those whose fear was openly expressed than for those whose fear had been interpreted by the doctor (3 against 2.4,

great, and happy is he who is clever enough to have learnt the secret of using, without abusing, the sweets and pleasures of the glorious season, now almost at its height, in our civilised metropolis. (*British Medical Journal* 1886;1:1181.)

A case recently came before Mr. Bushy, at the Worship Street Police Court, in which a young man was charged with gross misconduct in the third-class carriage of a train, on the London Railway, in the presence of a married woman, travelling in the same compartment. No assault was complained of, and, from the nature of the case, no corroborative or exculpatory evidence was, or could be, forthcoming. The defence was confined to a suggestion that the prosecutrix was suffering from nervous excitement, and was the victim of a hallucination. On the ground that nothing in the character or antecedents of the prosecutrix tended to show that she was at all likely to fabricate such a story, or to be the subject of hallucinations, the magistrate considered that the prisoner's story was hard labour. Without any special reference to the particular case, we may call attention to the extreme difficulty of deciding such cases as these, where the offence is purely moral, and where no corroborative or exculpatory evidence is procurable, nor effective contradiction made. The whole question, therefore, turns upon the characters of the parties involved, and this may very easily leave room for errors of the most serious kind. With all respect for the decision of the magistrate, who was probably far better able to form a correct opinion than anyone not present at the hearing, we would suggest that the case was one in which searching inquiry should have been instituted before sentencing the prisoner. Medical evidence might usefully have been had recourse to with the view of ascertaining whether or not the complainant had even signs of nervous instability. If her physical and moral character were satisfactorily proved, then a medico-legal inquiry into the mental condition of the prisoner would be called for. It is rare that these extreme cases tend to develop, and some facts might very possibly have been elicited with regard to his past history, which would have thrown some light on his moral state. In any case, an examination into the mental condition of the accused, and the character of his conduct, if the allegation were true, his conduct was hardly that of a man who should be permitted to continue at large. Perhaps one of these days our railway companies will consider the propriety of reserving special compartments for ladies, accompanied by a protector, following in this an old-standing custom on foreign lines of railway. As things are at present, men of good reputation are as much entitled to the very best protection as the most respectable of the railway authorities would be a great forbidding ladies accompanied by a smoker to enter smoking compartments. The danger of wrongly condemning a respectable man to be detained in a whole career will thus be minimised. (*British Medical Journal* 1886;1:689.)