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Abnormal cervical smears: are we in for an epidemic?

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Abstract

A retrospective study was conducted to examine the pattern of a disturbing increase in abnormal cervical smears in one health district. Past records over fifteen years (1965-79) were analysed to produce pick up rates according to age, screening state, severity of lesion, and area of residence. Main findings included an increased pick up rate in unscreened (5.8 to 12.9/1000 smears) and screened (0.9 to 3.6/1000 smears) women. The order of increase was proportionately much higher in women under 40 years. The only significant epidemiological variable in the catchment area was a substantial population increase, overweighted by the younger age groups.

The principal conclusion of the study was that the increased pick up rates of abnormal cervical smears in the district reflected a true increase in the incidence of premalignant lesions of the cervix. Screening efforts aided by computerisation should be examined nationwide in order to reach high risk groups and thus try to prevent an increase in carcinoma of the cervix.

Introduction

During the past seven years the Department of Health and Social Security annual returns from the cytology laboratory at this hospital (form SBH 40) have shown a sudden, pronounced increase in the number of cervical smears reported as "suspicious of severe dysplasia, carcinoma in situ, or worse." This increase has not been so dramatically paralleled in the total DHSS figures for England and Wales.¹ Concern was magnified by the fact that no special effort had been made to screen high

risk women in the area. Despite a large increase in the local population, the impression was that most of the smears examined came from previously screened women.

The returns made to the DHSS may be misleading for various reasons. The number of positive smears is not broken down by histological diagnosis and may include smears from patients with genital tract carcinomas other than cervical. They also include cytological false positive smears and cases of recurrent or residual neoplastic lesions of the cervix. The total number of smears examined gives no indication of the age groups or screening state of the women concerned. We therefore decided to analyse retrospectively the work done by the laboratory and to look for factors that might have contributed to an approximate doubling of the pick up rate of abnormal smears in the DHSS returns between 1975 and 1979 (8.9/1000 smears examined) compared with the previous 10 years (4.7/1000 smears examined). These included alterations in reporting by the laboratory, differences in screening practices, and changes in the population served.

Methods

A 10% sample was taken of all smears examined during the 15 years 1965-79. For each smear a record was made of the age of the woman, the year the smear was taken, and whether or not the woman had had a previous smear examined at the laboratory. These results were used to estimate the total number of smears taken from previously screened and unscreened women in each of the four age groups <30, 30-39, 40-49, and ≥50 during the three five year periods 1965-9, 1970-4, and 1975-9. Women who had had a previous smear examined at the hospital were classified as "screened." Information on smears taken elsewhere was unreliable, and for records where the only indication of a previous smear related to some other laboratory the smears were classified as screened or unscreened in the same proportions as for the other women in the appropriate subgroup.

The estimated total numbers of smears taken in each category were used as denominators in calculating the rates of positive smears. The numerators of these rates were calculated by extracting records relating to all women with positive smears over the same 15 year period. The few women who had positive smears taken elsewhere were classified as screened or unscreened proportionately, using the same procedure as for the denominators. Those who were found to have a histologically confirmed dysplasia, carcinoma in situ, or invasive carcinoma were classified according to the year of their

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first positive smear. From this the pick up rate of women with histologically proved and clinically unsuspected neoplastic lesions of the cervix per 1000 smears examined was calculated for the various groups of women. Women with clinically suspected invasive carcinoma of the cervix or other neoplastic lesions of the genital tract were not included in these figures.

A 5% sample of the records was analysed according to the three main areas in which the women lived. These were the Aylesbury district, the Milton Keynes district, and south Bedfordshire with west Hertfordshire. Those living outside these areas were grouped together in a fourth category. These sample figures were used to estimate the total number of smears examined from women living in these three areas in the same five year periods.

Information on the age and socioeconomic distribution of the female population in the three main areas served by the laboratory during the survey period was extracted from census and local planning authority records.

Results

The cytology laboratory was started by one of us (MW) in mid-1962, and from 1965 to 1971 a project was undertaken to screen over a three year period, and then rescreen, all the women over 25 living in the rural and urban districts of Aylesbury. By the end of that time it was estimated that roughly half of the women had had at least one smear. No other systematic screening programme was undertaken. In each of the five year periods three fifths of the smears were taken by general practitioners. In the first five years nearly one third of the smears came from patients attending hospital for gynaecological or obstetric reasons. In the last 10 years this proportion fell to one fifth, and most of the rest of the smears came from family planning clinics.

TABLE I—Numbers of smears examined in Stoke Mandeville Hospital's laboratory according to age and screening state of patients in three five year periods

	Age in years				Total
	< 30	30-39	40-49	≥ 50	
1965-9:					
Unscreened	9 700	10 200	7 600	4 500	32 100
Screened	2 100	3 200	2 200	1 900	9 300
1970-4:					
Unscreened	12 800	4 100	3 100	1 800	21 800
Screened	6 200	8 700	5 600	3 400	24 000
1975-9:					
Unscreened	13 600	3 600	1 900	1 500	20 600
Screened	11 400	14 800	9 500	5 900	41 600

TABLE II—Prevalence of unsuspected lesions of cervix in previously unscreened women/1000 smears examined (total numbers in parentheses)

	Age in years				Total
	< 30	30-39	40-49	≥ 50	
1965-9	3.1 (30)	5.8 (59)	9.4 (72)	5.3 (24)	5.8 (185)
1970-4	3.3 (42)	11.5 (47)	8.1 (25)	5.0 (9)	5.6 (123)
1975-9	9.2 (125)	24.0 (86)	19.1 (37)	12.5 (19)	12.9 (266)

There was an increasing number of smears examined during the 15 years (table I), and by the third five year period (1975-9) 50% more smears were examined compared with the first five year period (1965-9). These were accounted for by a growing number of repeat smears, while the number of first time smears fell. Sixty per cent of this increase came from women under the age of 30, and only in this age group did the actual number of first time smears increase. The overall pick up rates of clinically unsuspected invasive and pre-invasive lesions proved histologically during the three successive five year periods were 4.7, 3.2, and 6.8/1000 smears examined. When these figures were analysed according to screening state and age of the women (tables II and III) the pick up rate was found to have more than doubled in the previously unscreened women and trebled in the previously screened women. While the pick up rate had increased in all age groups, the largest increases were seen in women under 40. We emphasise, however, that since some of the numerators

(values in parentheses in tables II and III) were small and the denominators were based on samples and therefore subject to error the rates given in tables II and III were themselves subject to a wide margin of error. Nevertheless, the general pattern was unlikely to be materially affected.

The proportions of the different types of histological abnormality diagnosed were similar in the first and last five year periods (table IV). In the middle period (1970-4) more patients were referred to other hospitals for investigation of their abnormal smears, which resulted in an increase in the number of cases reported as dysplasia of unspecified severity.

Over the 15 years the population increase was considerable in all three of the main districts and was very high for the Milton Keynes district, where the building of a new city began in 1969 (table V).

TABLE III—Rates of unsuspected lesions of cervix in previously screened women/1000 smears examined (total numbers in parentheses)

	Age in years				Total
	< 30	30-39	40-49	≥ 50	
1965-9	0.5 (1)	0.6 (2)	1.3 (3)	1.1 (2)	0.9 (8)
1970-4	1.4 (9)	1.2 (10)	0.4 (2)	1.5 (5)	1.1 (26)
1975-9	3.7 (42)	5.1 (76)	2.4 (23)	1.5 (9)	3.6 (151)

TABLE IV—Proportions of different types of lesion diagnosed as result of positive smear report. Figures are percentages

	1965-9	1970-4	1975-9
Unsuspected invasive carcinoma	8	8	5
Carcinoma in situ	73	56	70
Severe dysplasia	8	15	12
Moderate dysplasia	8	10	7
Mild dysplasia	2	3	4
Dysplasia, severity unspecified	1	8	2

TABLE V—Population increases in areas served by laboratory. Figures are percentages

	England and Wales	Aylesbury	Milton Keynes	Parts of West Herts and South Beds
Overall % increase 1965-79	2.8	21.0	107.2	25.0 (estimated)
Females % increase 1971-81:				
Age 15-39 years	10.9	26.8	126.7	NA
Age 40 years and over	-0.3	13.9	38.9	NA
Overall pick up rate: % increase 1970-9	23.0*	123.0	131.0	76.0

*Up to 1977 only.
NA = Not available.

The changes in female population, using the 1971 and 1981 census figures split into two age groups, showed percentage increases well above the national average. The increase in younger women (15-39 years) was consistently greater than the increase in older age groups—a difference which was apparent in the national figures but which was very much exaggerated for Milton Keynes.

The social class structure of all three areas contained a lower than average proportion of unskilled and semiskilled workers compared with the national average. The overall pattern of change during the 15 years showed an upward shift in social class. By the end of the 1970s the proportion of the local population in professional, managerial, and other non-manual jobs compared with the national average was higher except in Milton Keynes, where it was about the same. No notable difference in the pick up rates of abnormal smears could be found among the three districts.

Discussion

This analysis confirmed that there had been a recent large increase in the detection of unsuspected malignant and pre-malignant lesions of the cervix in women whose smears had been examined by this laboratory. Breakdown according to age

groups and screening state showed a threefold to fourfold increase in the pick up rate of histologically confirmed abnormal cervical smears in the unscreened women under 40 during our 15 year period. The increase had started in the early 1970s in the women under 40 but was affecting all age groups in the second half of the decade.

Though the numbers were small, the trend towards an epidemic was undeniable and no artefactual cause could be found. No change could be detected in the screening practices of the cytology laboratory or reporting practices of the histology laboratory to account for this rise. The cytology department was overseen by the same cytopathologist, and the same two histopathologists were responsible for most of the histopathology reports throughout the survey period. The severity of the lesions diagnosed remained remarkably similar throughout. In an attempt to assess the laboratory's accuracy of screening we reassessed 229 smears reported as normal from 182 patients who subsequently had positive smears. In each five year period there was the same small number (one in 10) of these smears which, in retrospect, were found to contain a few dyskaryotic cells and for which a repeat smear should have been requested. None of these patients subsequently developed an invasive lesion.

Although the gynaecologists had changed, there were no appreciable changes in clinical practices. Nearly all the diagnoses of premalignant lesions were done from serial sections of cone biopsy or hysterectomy specimens as a result of an abnormal smear report. A colposcope was not available until the end of 1978, and its use made no noticeable contribution to the diagnostic results up to the end of 1979.

Some changes in screening practice over the 15 years may have affected the pick up rate. Special efforts had been made to screen as many as possible of the women over the age of 25 in the Aylesbury district from 1965 to 1968 and then rescreen them over the next three years. As 60% of the smears examined during 1965-9 came from the Aylesbury district, the pick up rate in this first five year period partly reflected the results of trying to include the high risk group of women in this area. No subsequent efforts were made to screen high risk patients, and in the 1970s women over the age of 40 were being screened for the first time at half the previous rate. This may have been the cause for the slight drop in the pick up rate in this age group in the early 1970s. In the second half of the 1970s, however, the pick up rate more than doubled in these unscreened older women.

Since 1973 there has been a national increase in the pick up rate of abnormal cervical smears in women under 35, as a recent analysis by Antonia Roberts showed.¹ She concluded, however, that her information was of limited value, as the necessary data on screening were not centrally available. Our own increase in pick up rate was greater than the national average. This may have been due to the fact that our area has the fastest growing population in Britain, which is most pronounced in the 15-39 year age group. These are the women with the greatest increase in abnormal smears.

Crude national statistics² suggest that social class is a relevant variable in mortality from malignant disease of the cervix, although in 1974 Beral³ pointed out that mortality varied considerably, even within the same social class, according to the husband's occupation. Harris *et al.*,⁴ in a recent study of the characteristics of women with premalignant disease of the cervix, found that social class did not appear to affect the risk of developing this condition and suggested that sexual behaviour has, over time, become less influenced by social class. The proportion of social classes IV and V in our local population is lower than the national average. The mobility, however, is high, and this may well result in a particularly large number of people who have had several sexual partners. This is a variable which Harris *et al.* found to be a highly significant factor in premalignant disease of the cervix.

When compared with national figures, the registration rates of carcinoma of the cervix from two of our districts (table VI)

TABLE VI—Registration of carcinoma of cervix/100 000 population

	Age in years					
	15-24	25-34	35-44	45-54	55-64	≥ 64
1971-5:						
Aylesbury and Milton Keynes		5.4	8.6	36.5	19.6	20.2
National rates (1973)	0.71	9.2	17.4	33.8	37.0	26.7
1976-80:						
Aylesbury and Milton Keynes		10.4	9.6	20.8	26.5	20.0
National rates (1978)	1.3	12.4	17.8	24.6	34.6	26.4

suggested a rapid increase in morbidity in women under 35, the rate having doubled in 1976-80 compared with the previous five years. In the same period there was also an increased morbidity in the 55-64 year age group, contrary to the national trend. The only visible achievement from screening in these figures was the almost 50% reduction of morbidity in the 45-54 age group. But, with the large increase in premalignant lesions of the cervix being diagnosed and treated, had there been no screening the actual increase in morbidity might have been starting to reach epidemic proportions in a wide range of women.

Conclusion

The implications of these findings are considerable. Firstly, there is a need for individual districts to undertake an ongoing analysis of cervical screening. For proper quality control computerisation of the laboratory records is essential. With accurate information individuals can plan together a much more effective screening programme. Local education should be used to encourage women to come for screening at reasonable intervals on their own initiative. Any extra efforts and expense at this stage should be directed at contacting probable high risk groups, particularly unscreened women over 35 whose morbidity from carcinoma of the cervix is known to be high, rather than recalling those already screened. For those who question the expenditure of money on computerisation at a time of grave economic crisis in the health service, we point out that the cytology laboratory is already highly cost effective. If only one third of the 121 patients with histologically proved severe dysplasia or carcinoma in situ diagnosed by our laboratory in 1982 were to develop invasive carcinoma as a result of lack of treatment, the cost of treating them would be more than the total cost of screening for and treating premalignant lesions of the cervix in that year. The rapidly increasing incidence of malignant disease of the cervix, which should surprise no one in view of the epidemiology of the disease and current sexual mores, demands that a much better use should be made of existing preventive medical facilities.

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