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IMPACT OF COLPOSCOPY ON MANAGEMENT OUTCOMES OF PATIENTS WITH ABNORMAL CERVICAL CYTOLOGY
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ABSTRACT

Background: **With stringent cervical cytology screening programmes for women in reproductive age group, cervical cancer is, to a large extent, preventable. Back-up confirmatory colposcopic evaluation is necessary in order for cytology to have impact on cervical cancer-related morbidity and mortality.**

Objectives: **To track the management outcomes of abnormal cervical cytology and hence confer credence to the value of colposcopy in management of abnormal cervical cytology.**

Design: **Retrospective descriptive study.**

Setting: **Kenya Medical Women Association Colposcopy Clinic.**

Main outcome measures: **Correlation of cervical cytologic abnormalities with colposcopic outcomes and eventual management outcomes.**

Results: **The population was young, with 50.6% being 25-34 years old, and 59.3% less than 35 years of age. Parity was also low, with nearly 75% being para three or less. A substantial proportion of women had normal colposcopic findings (42.0, 26.7, 18.6 and 11.1% for cytologic abnormalities CIN I, CIN II, CIN III and invasive carcinoma respectively). Colposcopic abnormality detection rate, irrespective of the severity of the lesion, increased with severity of cytologic lesion (from 58.0% CIN I to 89.0% for invasive carcinoma). The sensitivity of cervical cytology was 58, 59 and 65% for CIN I,II and III respectively, while respective specificity was 72, 71 and 85%. The concordance rates between cytological and colposcopic findings were 38.6, 32.5 and 60% for CIN I, II and III respectively. The eventual management outcome was operative (LEEP and Hysterectomy) in greater frequency as the severity of the cytologic lesion increased.**

Conclusion: **Colposcopy has significant impact on the management outcomes of abnormal cervical cytology and is therefore an invaluable procedure in management of abnormal cervical cytology. For this reason, it is imperative that governments avail these services to all women, in addition to enforcing regular cytologic screening for cervical cancer.**

INTRODUCTION

Cervical cancer is the second most common female cancer world wide but the most common in the less developed countries. It accounts for 20–30% of all female cancers in low resource countries (1,2), but for only 4–6% developed Western countries (2). This observation has largely been attributed to a policy of

mass screening using cervical cytologic methods (3). Thus, the value of a policy of mass cervical cytologic screening in reduction of the prevalence of cervical cancer is indubitable.

The main purpose of cervical cytologic screening by Papanicolaou (Pap) smears is to identify women with cervical lesions that confer an increased risk of cervical cancer (1,4). In order to achieve this, there is a need to objectively identify cervical intraepithelial neoplasia (CIN), which is the precancerous lesion (1). This lesion is non-invasive but exhibits genetic abnormalities, loss of cellular functions, some phenotypic characteristics of invasive cancer, and predicts a substantial likelihood of developing invasive cancer (5).

The potential to develop cervical carcinoma is a universal natural predisposition in all women that occurs during puberty. Increase in volume of the cervix causes ectropion thereby exposing columna cells to harsh hyper-acidic vaginal environment that destroys them. In response, there is proliferation of stromal reserve cells underlying the columna epithelium which results in immature and unstable columna epithelial cells and squamous metaplasia. Hence, there is a cephalad shift of the squamocolumna junction which creates a transformation zone from which cervical neoplasia almost invariably originates (1). Exposure of this unstable epithelium to carcinogens, especially to oncogenic strains of human papillomavirus (HPV), induces dysplastic changes (6,7) which carry a risk of progression to invasive cancer (8,9). This understanding justifies the necessity for universal routine cytological surveillance.

Despite Pap smear being the most cost-effective cancer screening test (1), it still has many shortcomings. Even after strict adherence to the adopted screening protocols, cervical cytology surveillance prevents development of most but not all cervical cancers (1,10-13). Both specificity and sensitivity of Pap smear lie within 50–90% in different settings (14-16). Hence, many abnormal smears are still missed out. Although Bethseda system of cytological classification is more objective (17), concurrence on management of atypical squamous cells of undetermined significance (ASCUS) and low-grade squamous intraepithelial lesion (LGSIL) remain elusive (18,19). Hence, this area remains grey and requires being addressed to in order to develop clear evidence-based guidelines.

The observation that a majority of cervical cancers occur in women who are not screened regularly gives credence to the impact of Pap smear in reduction of cervical cancer-related mortality (20,21). However, colposcopic and histological evaluation remains mandatory as back-up procedures and the ideal reference standard for cytological screening methods (11).

While the American Cancer Society establishes regular guidelines for early detection of cancer (22), Kenya has no such elaborate guidelines. Pap smear and colposcopic evaluation are a preserve of a few in the urban-based segments of the population. It is with this in mind that this study was designed in order to track the outcomes of management of abnormal cervical cytology and hence confer credence to the value of colposcopy in the management of abnormal cervical cytology.

MATERIALS AND METHODS

This was a retrospective descriptive study on women who had been diagnosed with abnormal cervical cytology on performing a routine Papanicolaou (Pap) smear. All these women were subjected to colposcopic evaluation. Since colposcopy is the most objective in identifying dysplastic intraepithelial lesions, histological results of colposcopically targeted biopsy were considered as the reference standard.

The study was conducted at the Kenya Medical Women Association (KMWA) clinic, which is situated within the primarily middle level southern sub-urban residential estates of Nairobi. The study period covered January 1995 to December 2000. The study population consisted of all women referred to KWMA clinic for colposcopy due to abnormal cervical cytology. The client record numbers were retrieved from the admission register and were used to retrieve the patients' records. Then, information on sociodemographic characteristics, cytological diagnosis of degree of cervical dysplasia, the histological diagnosis of colposcopically targeted biopsies and the eventual management outcome was collected by a trained research nurse using a structured pre-coded questionnaire. Once the data were collected, edited, entered into the computer and analysis done using SPSS/PC Version 7.5 program.

RESULTS

There were 270 patients who had had colposcopy done during the study period. All of their files were retrieved. Of these, 253 (93.7%) had complete records and hence constituted the records of the study population. Of the 253 clients, 88 (34.8%) had CIN I; 86 (34.0%) CIN II; 70 (27.7%) CIN Ill and nine (3.6%) had invasive carcinoma on cervical cytology.

Table 1 shows age and parity of the study population. The modal age-group was 30–34 (25.9%) and 50.7% were aged 25–34. Those aged less than 30 years were 33.3%, with less than 10% being under 25 years and just under 60% being below 35 years. On parity, 68.1% had 1–3 deliveries, and nearly 3/4 had had three or fewer deliveries.

Table 2 shows the relationship between cervical cytology results and the outcome of colposcopic evaluation. Of those who had CIN I by cytological evaluation, 42.0% had normal colposcopic evaluation outcome, while CIN I was reported in 38.6%, CIN II in 10.2%, CIN III in 8.0% and invasive carcinoma in 1.1%. Among those with CIN II by cytological evaluation, 26.7% had normal colposcopic findings, 22.1% CIN I, 32% the same (CIN II), 15.1% CIN Ill and 3.3% had invasive carcinoma. Patients referred for colposcopy with cytological diagnosis of CIN m had 60.0% of them having CIN III, with 18.6% having normal colposcopic evaluation, and two (2.2%) having invasive carcinoma. Also, of the nine clients who had cytological diagnosis of invasive carcinoma, only three had colposcopic diagnosis of invasive carcinoma, three CIN III and one had normal cervical cytology.

Colposcopic abnormality detection rates, irrespective of the severity of the abnormality detected, are depicted in Figure 1. The abnormality detection rate was 68.0% among women with cytological report CIN I; 73.3% for CIN II; 81.4% for CIN III and 88.9% for invasive carcinoma.

Table 3 shows that the concordance rates between the cervical smear abnormalities and colposcopically targeted biopsy histological report which was highest among those with smear categorised as CIN III (60.0%). For all cytologically-based categories of cervical dysplasia, there were large proportions of women in whom histologically based categorisation of dysplasia was better, or even normal – 42% for CIN I; 48.8% for CIN II; 37.1% for CIN III, and 66.7% for invasive cancer. Histological outcomes turned out to be worse than cytological classification seen in 19% of those with CIN I; 18.6% for CIN II, but only 4.3% for CIN III. For cytological diagnosis of invasive cancer, 2/3 of the patients had better results with only 1/3 having invasive cancer on histological evaluation. The overall concordance rate between cytological findings and colposcopic outcome was 42.3%, with a similar proportion (43.9%) having better outcomes on histological outcome of colposcopically targeted biopsies. Taking colposcopic targeted biopsy as the reference standard, the sensitivity of cervical cytology for CIN I was 58% and specificity was 72%. There was 33% agreement in CIN II (sensitivity 59% and specificity 71%), while CIN III had the best level of agreement (sensitivity 65% and specificity 85%).

Table 1

Age and parity distribution (n = 270)

Characteristic	Frequency		Cumulative frequency	
Age in years	No.	(%)	No.	(%)
<20	1	0.4	1	0.4
20–24	22	8.1	23	8.5
25–29	67	24.8	90	33.3
30–34	70	25.9	160	59.3
35-39	53	19.6	213	78.9
40–44	26	9.6	239	88.5
>45	31	11.5	270	100
Parity				
0	16	5.9	16	5.9
1–3	184	68.1	200	74.1
4–6	48	17.8	248	91.8
>6	22	8.1	270	100

Table 2

Colposcopic findings by cervical cytology results

Cytology results	No.	Colposcopic findings: Normal No. (%)	CIN I No. (%)	CIN II No. (%)	CIN III No. (%)	INV Ca No. (%)
CIN I	88	37 42.0	34 38.6	9 10.2	7 8.0	1 1.1
CIN II	86	23 26.7	19 22.1	28 32.6	13 15.1	3 3.3
CIN III	70	13 18.6	4 5.7	9 12.9	42 60.0	2 2.9
Invasive cancer	9	1 11.1	1 11.1	1 11.1	3 33.3	3 33.3
Total	253	74 29.2	58 22.9	47 18.6	65 25.7	9 3.6

Figure 1

Colposcopic abnormality detection rates by results of cervical cytology

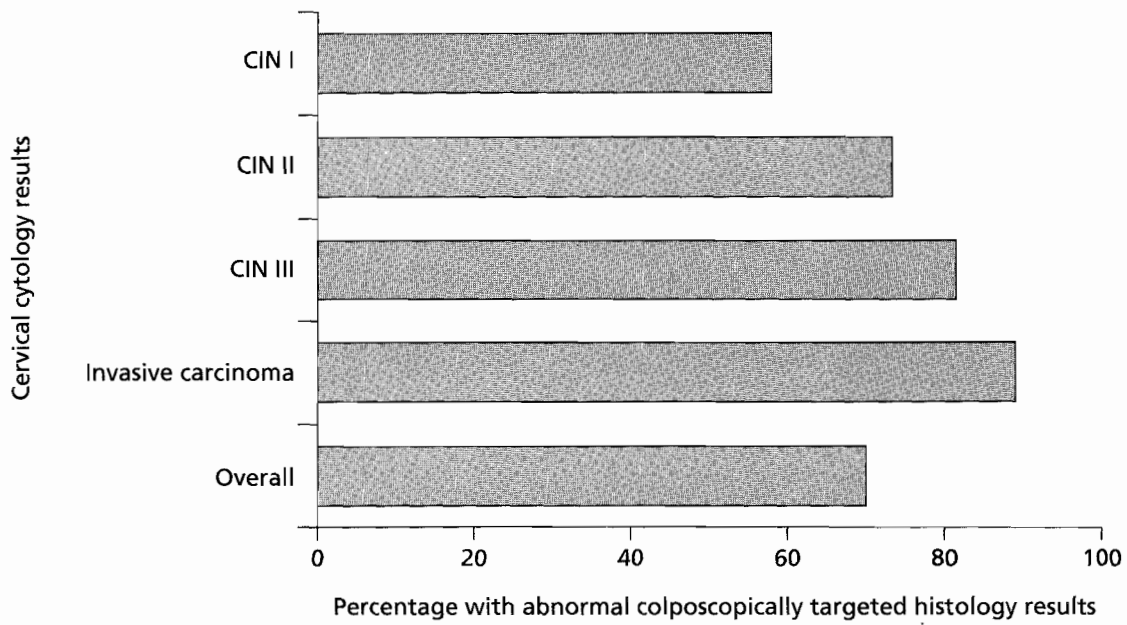

Table 3

Concordance rates between cytological and colposcopic findings

Cytological findings	No.	Colposcopic findings: Better No. (%)	Same No. (%)	Worse No. (%)
CIN I	88	37 42.0	34 38.6	17 19.3
CIN II	86	42 48.8	28 32.5	16 18.6
CIN III	70	26 37.1	42 60.0	3 4.3
Invasive cancer	9	6 66.7	3 33.3	———
Total	253	111 43.9	107 42.3	36 14.2

Table 4

Management offered for abnormal colposcopic findings

Colposcopic findings	No.	Management offered: Cytology surveillance No. (%)	Cryosurgery No. (%)	LEEP No. (%)	Hysterectomy No. (%)
CINI	58	10 17.2	35 60.3	13 22.4	———
CIN II	47	3 6.4	4 8.5	39 83.0	1 2.1
CIN III	65	———	———	56 86.2	9 13.8
Invasive cancer	9	———	———	3 33.3	6 66.6
Total	179	13 7.3	39 21.9	111 62.0	16 8.9

Table 5

Eventual treatment modality by cytological results

Colposcopic results	No.	Cytology surveillance No. (%)	Cryosurgery No. (%)	LEEP No. (%)	Hysterectomy No. (%)
CINI	88	41 46.6	25 28.4	19 21.6	3 3.0
CIN II	86	30 34.9	10 11.6	42 48.8	4 4.7
CIN III	70	14 20.0	4 5.7	46 65.7	6 8.6
Invasive cancer	9	1 11.1	———	5 55.6	3 33.3
Total	253	86 34.0	39 15.4	112 44.3	16 6.3

Table 4 shows the management offered after colposcopic evaluation. Of the 253 abnormal cervical cytology reports, 179 (70.1%) showed abnormalities of variable degrees on histological evaluation of colposcopically targeted biopsies, upon which basis definite interventions were made. For patients with histologically diagnosed mild dysplasia (CIN I), 60.3% were treated with cryotherapy, 22.4% had the loop electrosurgical excision procedure (LEEP), while 17.2 % had follow-up with cytological surveillance – none had hysterectomy. On the other hand, 83.0 and 86.2% of those who had histological diagnosis of CIN II and CIN III respectively had LEEP. The respective proportions of patients who had hysterectomy were 2.1 and 13.6%. Overall, the severe the disease, the more invasive was the treatment.

The eventual management outcome by the presenting cytological diagnosis is shown in Table 5. The proportion of women who had LEEP was 21.6, 48.8 and 65.7% for patients with cytological diagnosis of CIN I, CIN II and CIN III respectively. The respective proportions of those who were offered hysterectomy were 3.0, 4.7 and 8.6%. On the whole, the proportion receiving conservative management decreased with increasing severity of dysplasia while the converse was true about operative intervention.

DISCUSSION

This study sheds light on several aspects regarding management outcomes of abnormal cervical cytology after the patients were subjected to colposcopic evaluation. Taking colposcopically targeted biopsy histological report as the most objective, and hence as the reference standard, two most significant inferences can be derived: first, that no abnormality of cervical cytology should be ignored on basis of severity criteria (17,23). Secondly, abnormal cervical cytology constitutes a vital but loose correlate of the eventual abnormalities that are based on confirmatory colposcopically targeted histological biopsy results.

Despite the popularity of the Pap smear, sensitivity and specificity still remain low. This observation has been made in other recent studies too (11-14). In this study, both sensitivity and specificity were lower for CIN I and II than CIN III. As has been noted, normal colposcopic outcomes

were found in approximately 2/5, 1/4 and 1/5 of subjects with cytological diagnosis of CIN I, II and Ill respectively – these are significant proportions which cannot be ignored. Another observation was the low concordance rates, with the lowest being 32.5% for CIN II and highest being 60.0% for CIN III. These findings serve to underscore the pivotal role of colposcopy in the management of abnormal cytology, irrespective of the severity of the abnormality. Some regimens recommend primary colposcopic evaluation only if lesions are high grade (CIN II$^+$) (24,25) while others advocate that, in addition to CIN II$^+$ lesions, colposcopic evaluation should be carried out if two consecutive smears show ASCUS 4–12 months apart, if there is ASCUS and HPV is positive, or if the lesion is greater than ASCUS (24,26). The basis of these has been the observation that many women with ASCUS and CIN I have histopathologically confirmed CIN II$^+$ (27-29) and in up to 1/3 of women with CIN II$^+$ lesions will have had ASCUS (29). In addition, the prevalence of oncogenic HPV DNA in atypical lesions has been shown to be high, being 52 and 69% in ASCUS and LGSIL respectively (19). It is on this basis that Arbyn *et al* (18) wonders whether HPV testing should be used as a triage method to identify women at risk of cervical cancer and therefore requiring referral for colposcopic exploration.

These observations are not meant, by any means, to underrate the importance of routine scheduled cervical cytology screening, but rather to serve as a caution while dismissing atypical and low grade lesions. Globally, countries that have enforced policies and guidelines on cervical cytology screening with resultant high prevalence of cervical cytologic screening have experienced dramatic fall in cervical cancer-related mortality (1,3).

Accessibility of the cervix and ease of specimen collection as well as relatively high ability to pick up cytological abnormalities, which serve as surrogates for abnormal intraepithelial cellular activity, is the envy of all other subspecialties and specialties. In spite of the generally low sensitivity and specificity, the colposcopically directed histological abnormality detection rates, irrespective of the degree of the abnormality, among women with various cervical cytological abnormalities was acceptably high (58.0, 73.3, 81.4, 89.0 and 70.0% for cervical cytology reported as CIN I, CIN II, CIN III, invasive carcinoma and overall detection rates respectively). These findings further accentuate the value of colposcopy in women with abnormal cytology. Even when the final management outcome is a decision on conservative cytological surveillance, a nidus of abnormality that confers a possible risk of cervical cancer will have been ascertained and stringent follow-up regimen can be emphasised and instituted.

Based on the results of this study, it can be concluded that cervical cytology, despite many shortcomings, is an epidemiologically effective surrogate tool for detecting intraepithelial lesions. However, colposcopy has significant impact on the eventual management outcomes of abnormal cervical cytology, irrespective of the severity of cytologically determined abnormality. Therefore, it is recommended that colposcopy services should be made more available countrywide and that all women with abnormal cytology should be subjected to colposcopic evaluation irrespective of the severity of the lesion.

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