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CHARACTERIZATION OF ADENOCARCINOMA AND SQUAMOUS CELL CARCINOMA OF THE CERVIX IN NNAMDI AZIKIWE UNIVERSITY TEACHING HOSPITAL, NNEWI NIGERIA.

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ABSTRACT

Background: Cervical cancer remains a major health concern, particularly in developing countries. Understanding the distinct characteristics and clinical presentations of adenocarcinoma and squamous cell carcinoma is crucial for improving diagnostic and therapeutic strategies, especially in resource-limited settings like Nigeria.

Aim: This study compared the histopathological characteristics of adenocarcinoma (ADC) and squamous cell carcinoma (SCC) of the cervix at Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria.

Methods: A retrospective analysis was conducted on 117 cervical cancer biopsies retrieved for the Histopathology Laboratory of Nnamdi Azikiwe University Teaching Hospital, which included 15 adenocarcinomas (12.82%), 26 squamous cell carcinoma in situ (SCCIS) (22.20%), and 76 invasive squamous cell carcinomas (ISCC) (64.95%). The samples were processed using the conventional Haematoxylin and Eosin staining method. Data on patient age, cancer grade, and tumour cell type were also collected.

Results: The mean ages for ADC, SCCIS, and ISCC were 44.9, 54.3, and 56.5 years, respectively. Among ADC cases, 11 (73.33%) were well-differentiated and 4 (26.67%) moderately differentiated. In SCCIS, 25 (96.20%) were well-differentiated and 1 (3.80%) moderately differentiated, while ISCC had 42 (55.30%) well-differentiated, 27 (35.50%) moderately differentiated, and 7 (9.20%) poorly differentiated tumours. Non-keratinizing squamous cell carcinoma was more prevalent 63 (61.76%) compared to keratinizing types 39 (38.24%).

Conclusion: SCC is more prevalent than ADC among cervical cancer cases, with older age at diagnosis for SCCIS and ISCC. High rates of well-differentiated SCCIS and ADC highlight the importance of early detection, while the presence of poorly differentiated ISCC reflect delayed diagnosis and indicates a need for aggressive treatment. Tailored treatment strategies based on histological subtypes and continuous monitoring are recommended to improve patient outcomes.

Key Words: *Cervical Cancer, Adenocarcinoma, Squamous Cell Carcinoma, Histopathological Characteristics*

INTRODUCTION

Cervical cancer remains a significant public health issue worldwide, particularly in low- and middle-income countries where access to healthcare services is limited. Globally, it is the fourth most common cancer among women, with an estimated 604,000 new cases and 342,000 deaths worldwide[1]. Nigeria faces a significant burden of cervical cancer, with it being the second-most diagnosed cancer in West Africa[2]. In 2020, approximately 12,000 new cases of cervical cancer were reported in Nigeria, with over 8,000 deaths attributed to the disease[3]. The high incidence translates to substantial mortality, with many women diagnosed at advanced stages[4]. Studies suggest over 72% of cases are detected in later stages,

significantly reducing survival rates[5]. This late presentation is linked to limited access to screening programs, leading to missed opportunities for early detection and treatment. Eastern Nigeria, like many regions in the country, faces a high burden of cervical cancer. The region's healthcare infrastructure is often under-resourced, with limited access to cancer screening, diagnostic services, and treatment facilities. Socio-cultural factors, including stigmatization and lack of awareness, contribute to the late presentation and diagnosis of cervical cancer cases. Additionally, economic constraints and inadequate health education further exacerbate the situation, leading to poor outcomes for women diagnosed with cervical cancer[6]. This characterization analysis examines the prevalence, age distribution, histological grades, and tumour cell types of adenocarcinoma and SCC among patients at Nnamdi Azikiwe University Teaching Hospital in Nnewi, Nigeria. By analyzing 117 cervical cancer biopsies, this study aimed to provide insights into the patterns and characteristics of these cancer types within this specific population. The findings are contextualized within the broader literature, highlighting consistencies and discrepancies with global trends and underscoring the importance of localized data in guiding clinical practices and public health policies. By delving into the data from Nnamdi Azikiwe University Teaching Hospital, this discussion sheds light on the epidemiological landscape of cervical cancer in Nigeria, offering a critical foundation for improving patient outcomes through targeted interventions.

MATERIALS AND METHODS

Study design

This was a 5-year retrospective study that comparatively analyzed different tumour types in previously diagnosed samples of formalin fixed, paraffin wax embedded cervical cancer tissue blocks from 2018 to 2022 retrieved from the Histopathology Department of Nnamdi Azikiwe University Teaching Hospital Nnewi. Also retrieved from the available records were patients' biodata. Ethical approval for the study was obtained from the Ethics Committee (NAUTH/CS/66/VOL.16/VER.3/288/2023/074) of the hospital before commencement of the study.

Sample collection

A total of 117 formalin-fixed paraffin embedded cervical specimens were selected from the Hospital archives. Samples were cervical (punch) biopsy, endocervical curettage or hysterectomy specimens. Inadequate tissue sections, and cases with no clinical information in the records or for which the tissue blocks are missing or damaged were excluded from the study. All samples selected were sectioned at 4 microns using a rotary microtome (HM340E ThermoScientific. Massachusetts, United States of America), serial sections were made, floated on warm water bath set at 45^0C unto clean grease free slides.

Haematoxylin and Eosin (H&E) Staining[7]

The sections were stained using H&E staining method and photomicrographs of sections taken using Amscope digital camera eyepiece attached to an Olympus optical microscope.

Data Analysis

Data obtained were analyzed and results presented in tables, and plates.

RESULTS

One hundred and seventeen (117) cervical cancer biopsies were analyzed among which 15 (12.82%) were Adenocarcinoma, 26 (22.20%) Squamous cell carcinoma-in-situ, and 76 (64.95%) were invasive squamous cell carcinoma and according to age groups, the mean age of Adenocarcinoma was 44.9, squamous cell carcinoma-in-situ was 54.3 and invasive squamous cell carcinoma was 56.5 (Table 1). According to cancer grade, 11 (73.33%) adenocarcinoma are well differentiated, and 4 (26.67%) are moderately diffentiated (Plate I), 25 (96.20%) squamous cell carcinoma-in-situ are well differentiated and 1 (3.80%) are moderately diffentiated (Plate II), while 42 (55.30%) Invasive squamous cell carcinoma are well differentiated, 27 (35.5%) moderately differentiated, and 7 (9.2%) are poorly differentiated (Table 2) (Plate III). According to tumour cell type, 39 (38.24%) are keratinizing squamous cell carcinoma, of which 8 (20.51%) were keratinizing squamous cell carcinoma-in-situ (Plate I), and 31 (79.49%) were keratinizing invasive squamous cell carcinoma (Plate II), while 63 (61.76%) are non-keratinizing squamous cell carcinoma of which 18 (28.57%) were non-keratinizing squamous cell carcinoma-in-situ and 45 (71.43%) were non-keratinizing invasive squamous cell carcinoma (Table 3).

Table 1: Descriptive statistics of different cervical cancer diagnosis and age showing mean and standard deviation.

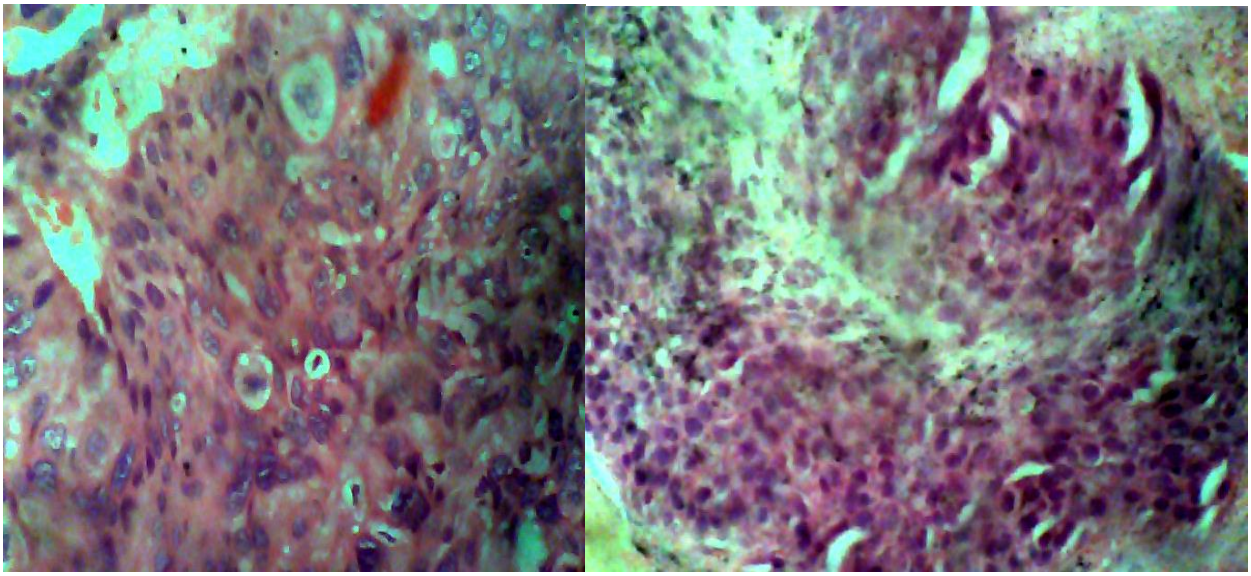
Diagnosis	Frequency	Percentage (%)	Mean ± Standard deviation
Adenocarcinoma	15	12.82	44.93±8.28
Squamous cell carcinoma in-situ	26	22.20	54.26±10.69
Invasive Squamous cell carcinoma	76	64.95	56.48±13.52
Total	117	100.0	

Table 2: Frequency table of different cervical cancer diagnosis and cancer grades.

Diagnosis	Grade	Frequency	Percentage (%)
Adenocarcinoma	Well differentiated	11	73.30
	Moderately differentiated	4	26.70
	Poorly differentiated	0	0.00
Squamous cell carcinoma in-situ	Well differentiated	25	96.20
	Moderately differentiated	1	3.80
	Poorly differentiated	0	0.00
Invasive Squamous cell carcinoma	Well differentiated	42	55.30
	Moderately differentiated	27	35.50
	Poorly differentiated	7	9.20
Total		117	100

Table 3: Frequency table of cervical cancer diagnosis and tumour cell types.

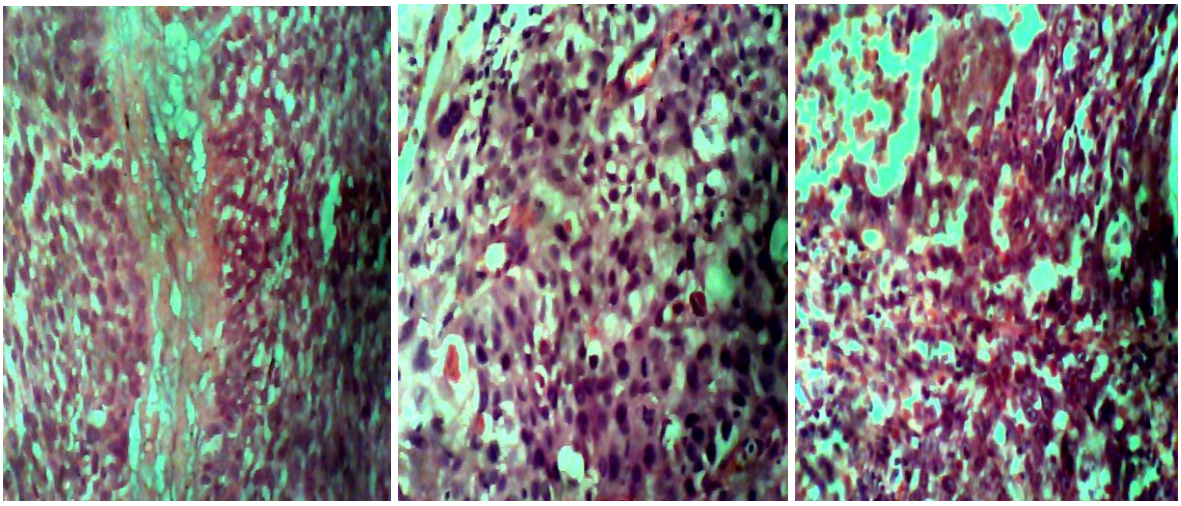
Diagnosis	Cell type		Frequency	Percentage (%)
	Keratinizing	**Non-Keratinizing**		
SCCIS	**8 (20.51%)**	**18 (28.57%)**	**26**	**25.49%**
ISCC	**31 (79.49%)**	**45 (71.43%)**	**76**	**74.51%**
Total	**39 (38.24%)**	**63 (61.76%)**	**102**	**100%**



Well Diff. K. SCCIS H&E x40 Mod. Diff. NK SCCIS H&E x40

Plate 1: Haematoxylin and eosin images of well, and moderately differentiated squamous cell carcinoma-in-situ showing proliferation of squamous epithelium, nuclear crowding, loss of nuclear polarity and significant cytonuclear atypia. Tumours exhibit abundant intercellular bridges, cytoplasmic keratinization, and keratin pearls.

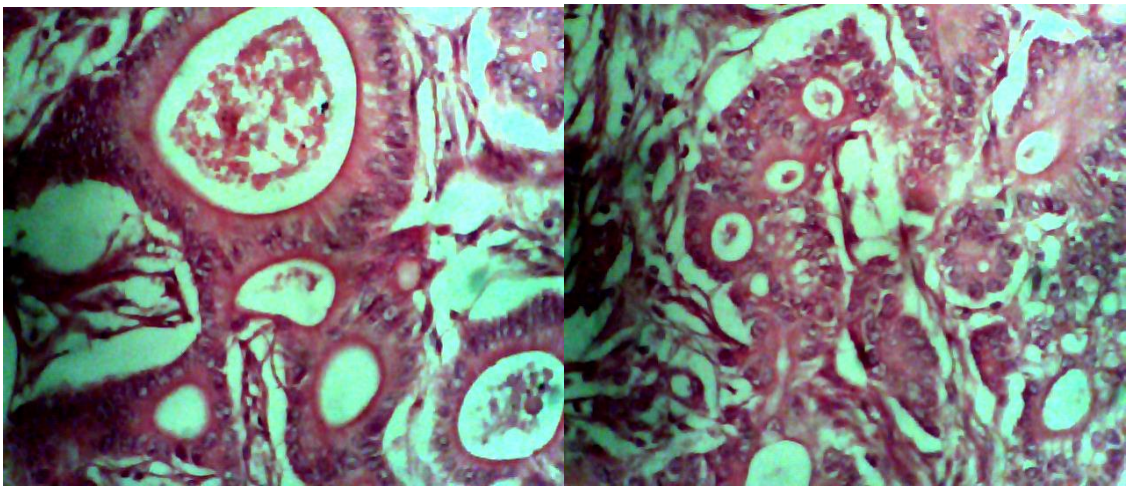
Key:
Well Diff. K. SCCIS = Well Differentiated Keratinizing Squamous Cell Carcinoma – in - situ
Mod. Diff. NK SCCIS = Moderately Differentiated Non-Keratinizing Squamous Cell Carcinoma – in – situ.



Well Diff. NK. ISCC. H&E x40 Mod. Diff. K. ISCC. H&E x40 PD. NK. ISCC. H&E x40

Plate 2: Haematoxylin and eosin images of well, moderately, and poorly differentiated Invasive squamous cell carcinoma showing proliferation of squamous epithelium composed of infiltrating malignant squamous cells with large, hyperchromatic nuclei with some of the tumours exhibiting cytoplasmic keratinization, and keratin pearls.

Key:
Well Diff. NK. ISCC= Well Differentiated Non-keratinizing Invasive Squamous Cell Carcinoma
Mod. Diff. K. ISCC= Moderately Differentiated Keratinizing Invasive Squamous Cell Carcinoma
PD. NK. ISCC. = Poorly Differentiated Non-keratinizing Invasive Squamous Cell Carcinoma



Well Diff. ADC. H and E x40 Mod. Diff. ADC. H and E x40

Plate 3: Haematoxylin and eosin images of well differentiated and moderately differentiated Adenocarcinoma showing proliferation of glandular epithelium composed of malignant endocervical cells with large, hyperchromatic nuclei.
Key:

Well Diff. ADC. = Well Differentiated Adenocarcinoma
H and E= Haematoxylin and Eosin
Mod. Diff. ADC. = Moderately Differentiated Adenocarcinoma

DISCUSSION

The present study revealed that unvasive squamous cell carcinoma (ISCC) is the most prevalent type of cervical cancer, accounting for 64.95% of cases, while Adenocarcinoma (ADC) accounts for 12.82%, and Squamous cell carcinoma-in-situ (SCCIS) represents 22.20%. This pattern align with findings from various global studies. The predominance of Squamous cell carcinoma (SCC) (both in situ and invasive) over adenocarcinoma is consistent with global statistics, which show that SCC accounts for about 70-80% of cervical cancers, while ADC constitutes 10-20% [8,9,10]. The mean age for SCCIS and ISCC patients in this study (54.3 and 56.5 years, respectively) is slightly higher compared to some studies which report mean ages around 45-50 years for SCC[11]. The older age at diagnosis for SCCIS and ISCC might reflect delayed diagnosis or differences in the population's risk profile. The mean age for ADC (44.9 years) is in line with other studies suggesting that ADC tends to occur in younger women compared to SCC[8]. The high percentage of well-differentiated tumours in SCCIS (96.20%) and ADC (73.33%) highlights the importance of early detection and appropriate grading. Well-differentiated tumours generally have a better prognosis[12]. The presence of poorly

differentiated ISCC (9.20%) highlights areas for improvement in early intervention and underscores the need for aggressive treatment strategies and closer monitoring due to their poorer prognosis[13]. The distribution between keratinizing and non-keratinizing types is notable, with non-keratinizing squamous cell carcinomas being more prevalent (61.76%). This distribution is significant as non-keratinizing carcinomas are often associated with a better response to radiotherapy [14].

CONCLUSION

There is need to implement comprehensive screening programs to identify both ADC and SCC early, develop personalized treatment plans based on histological subtype and differentiation grade, establish protocols for managing poorly differentiated ISCC cases, monitor treatment outcomes and conduct further research to optimize management strategies, and increase awareness and education about cervical cancer and the importance of regular screenings. By empowering women and strengthening the healthcare system, Nigeria can move towards a future where cervical cancer is a disease of the past, not a leading cause of death.

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