

## ORIGINAL ARTICLE

LEIOMYOMA: ITS VARIANTS AND SECONDARY CHANGES  
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**Background:** Abnormal uterine bleeding is a common problem encountered by the gynaecologists, leiomyoma being one of the most common causes. An accurate knowledge of the different variants and secondary changes occurring in leiomyoma is essential as some of these may mimic malignancy clinically, radiologically and histologically. Some important examples being atypical, cellular and mitotically active leiomyoma. Similarly, hydropic and myxoid change can be misdiagnosed as malignancy. While dealing with these variants and changes, leiomyosarcoma although a rare tumour has to be excluded because of the difference in management. Hence a comprehensive knowledge of all the variants is mandatory to avoid misdiagnosis. **Methods:** This study was carried out at the Pathology Department of Ayub Medical College Abbottabad where 964 cases of leiomyoma of the female genital tract were studied. These cases were received during the period January 2013 to December 2017. **Result:** The most common variant of leiomyoma was cellular leiomyoma while hyaline degeneration was the most common secondary change identified. **Conclusion:** Accurate knowledge of these variants and degenerative changes in leiomyomas are mandatory to prevent misdiagnosis and over treatment along with undue stress to the patient. Secondly it is important to identify variants which require follow-up.

**Keywords:** Hysterectomy; Leiomyoma variants; Secondary changes; Hyaline degeneration

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## INTRODUCTION

Leiomyoma is the most common benign smooth muscle tumour of the female genital tract.<sup>1</sup> Clinically it may present as abnormal bleeding, pressure perineum, abdominal pain, infertility, anaemia and fatigue thus affecting the patients socially and economically.<sup>2,3</sup> Of the normal female population about 4.5–17.8% females of the reproductive age group have leiomyomas.<sup>4</sup> However there is a geographic variation with increased incidence of leiomyoma in African population as compared to western population.<sup>5</sup> In Pakistan the incidence of leiomyoma varies between 20–40% in various studies.<sup>6</sup> Within the female genital tract the myometrium is the commonest site for leiomyoma but rarely it may occur in the vulva, vagina and broad ligament and other unusual sites like ovary and urinary bladder.<sup>7</sup> More than twenty variants of leiomyoma have been identified, while a variety of secondary changes which include hyaline degeneration, myxoid change, cystic change, calcification, and fatty metamorphosis have also been documented.<sup>8</sup> The variants include red degeneration, apoplectic, cellular, symplastic, mitotically active, leiomyolipoma, palisaded, epithelioid and leiomyoma with lymphocytic infiltrate. Some of the leiomyoma have been categorized on the basis of growth pattern such as cotyledonoid, dissecting, parasitic, diffuse and intravenous.<sup>9</sup> Irrespective of the different morphological variations, management is the same for all leiomyoma except in certain variants.

However, variation in morphology and growth pattern may be worrisome and may lead to an erroneous diagnosis of malignancy in some cases. Hence knowledge of the commonly occurring variants, secondary changes and growth pattern is important.<sup>10</sup>

This study was designed to determine the frequencies of various variants and the presence of secondary changes in leiomyomas. It included myomectomy and hysterectomy specimens, received at Pathology department of Ayub Medical College Abbottabad over a period of five years.

## MATERIAL AND METHODS

This is a retrospective study conducted in the department of Pathology Ayub Medical College, Abbottabad, from January 2013 to December 2017. A total of 964 cases were included in the study. Out of which 70.22% (677 cases) were hysterectomy specimens while 29.77% (287 case) were myomectomy specimens. Patient data including age, symptoms and diagnosis were noted. The specimens were received in 10% buffered formalin along with a Performa containing all the relevant clinical and radiological information. They were labelled and submitted to the histopathology laboratory. Gross examination of the specimen was carried out and noted. The tissue was processed for paraffin embedding, sectioned at 5 µm, mounted on slides and stained with Haematoxylin and Eosin (H & E). Microscopic examination was

performed by Consultant Histopathologist. SPSS version 19 was used for statistical analysis.

**RESULTS**

During the study period a total of 964 specimens with leiomyoma from the uterus were received. Multiple leiomyomas were found in 64% of cases and the size ranged from 01 to 18 cm. The mean age of the patients was 39 years while the patient’s age ranged from 25 to 55 years.

Out of 964 cases secondary changes were seen in 66.2% (639 cases) of the total cases. The most frequent secondary change was hyaline degeneration (Figure-1), which constituted 58.6% (565 cases) of the cases with secondary change. The frequencies of other changes are given in table-1. In 4.2% (41 cases) of the total cases, different variants were identified which is depicted in table-2. Cellular leiomyoma was the commonest variant and constituted 51.1% (21 cases) of these cases. Classical morphology of leiomyoma was noted in 29.4% (284 cases).

**Table-1: Frequency of secondary changes in leiomyoma (n=639)**

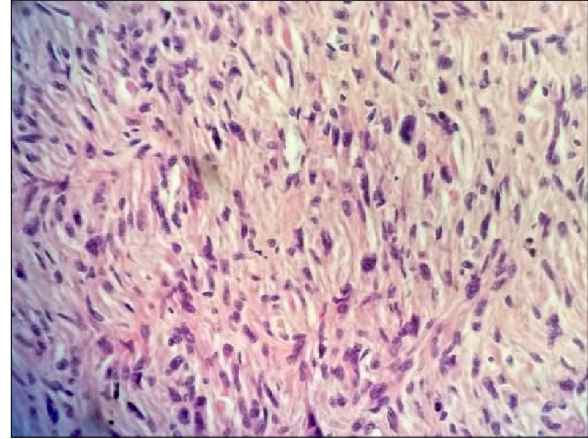
Secondary Changes	Number of cases	Percentage
Hyaline degeneration	565	88.41
Cystic change	47	7.35
Calcification	22	3.44
Red degeneration	03	0.48
Myxoid degeneration	02	0.32
	639	100

**Table-2: Frequency of different variants of leiomyoma (n=4)**

Variants of Leiomyoma	Number of cases	Percentage
Cellular	21	51.21
Palisaded	08	19.51
Symplastic	05	12.19
Lymphocytic rich	04	9.75
Lipoleiomyoma	03	7.31
Total	41	100



**Figure-1: Note the calcification and hyaline change within the leiomyoma. (H&E 20X)**



**Figure-2: Cells showing atypia in symplastic leiomyoma. (H&E 40X)**

**DISCUSSION**

The most common pelvic tumour in the reproductive age group is leiomyoma, occurring in 20–40% of females. Leiomyomas may have a diverse clinical, radiological and morphological pattern and are hormone responsive. Clinically they may be sporadic or syndromic and may present with abdominal pain, menorrhagia and pelvic mass.<sup>11</sup> Classical examples of leiomyoma associated with syndromes include Hereditary Leiomyomatosis & renal cell carcinoma syndrome<sup>12</sup> and Bannayan-Zonana syndrome<sup>13</sup>. Leiomyomas have been described on the basis of morphology into two separate categories one classified as variants while the other as leiomyomas with secondary changes. A third category is based on the pattern of growth. Identification and knowledge of these morphological variations is important for diagnosis and management.

Hyaline degeneration is the most commonly occurring secondary change and occurs due to ischemia following rapid growth of the tumour. It is characterized by accumulation of mucopolysaccharide around the muscle fibers<sup>14</sup> and is mandatory to differentiate from coagulative necrosis which is an important diagnostic feature of leiomyosarcoma<sup>15</sup>. In our study out of 964 leiomyomas 565 cases (58.60%) had hyaline degeneration. This is comparable to studies carried out by Dayal S<sup>8</sup> and Simms-Stewart D<sup>14</sup>.

Other secondary changes identified included cystic change in 47 cases (7.35%), and calcification in 22 cases (3.44%). Cystic change is considered to be the end result of severe oedema<sup>16</sup> while calcification is often seen in postmenopausal females<sup>14</sup>. Red degeneration is associated with pregnancy<sup>14</sup> and was seen in 3 cases (0.48%) and myxoid degeneration was also identified in 2 cases (0.32%) of patients.

Although there are many variants of leiomyoma, but in our study five variants were identified which constituted a total of 41 cases (4.2%). The most common was cellular leiomyoma which was observed in 21 cases (2.1%) out of 964. This is comparative to studies carried out by Sikora-Szczeńiak DL in which the frequency of cellular leiomyoma was 05%.<sup>17</sup> Cellular leiomyoma was diagnosed in females between 25–35 years of age and grossly size ranged from 6–10 cm. By definition cellular leiomyoma is a smooth muscle tumour with increased cellularity when compared to surrounding myometrium. The most important differential of cellular leiomyoma is endometrial stromal sarcoma. In most of the cases routine histopathology is sufficient to differentiate these lesions. However, in few cases with extremely cellular leiomyomas immunohistochemistry is used to resolve this dilemma.<sup>18</sup>

Palisaded leiomyoma is an unusual pattern, also known as leiomyomas with schwannoma-like or neurilemmoma-like differentiation. They were identified in 8 cases which constituted 0.8% of the total cases. Although these tumours are rare with a good prognosis recurrence in case of myomectomy may occur hence complete surgical resection is considered the definitive treatment.<sup>19</sup>

Bizarre leiomyoma (Symplastic) is an important entity as it can be misdiagnosed as leiomyosarcoma (Figure-2). It is characterized by spindle cells along with scattered multinucleated bizarre cells with prominent nucleoli that may mimic atypical cells.<sup>20</sup> Five cases (12.19%) of bizarre leiomyoma were seen in this study which constituted 0.5% of the total cases. It consisted of bland spindle cells along with scattered pleomorphic and multinucleated cells, no necrosis or atypical mitotic figures were identified. The last two features are important for differentiation from leiomyosarcoma. Four cases (9.75%) of leiomyoma with lymphocytic infiltration were identified. The tumour showed smooth muscle fibres with infiltration by lymphocytes and few plasma cells. This variant can be confused with lymphoma and inflammatory pseudotumor.<sup>21</sup>

Lipoleiomyoma is a rare entity which should be differentiated from liposarcoma.<sup>22</sup> In our study three cases were identified. On gross examination in addition to white whorled appearance yellowish discoloration was seen. On microscopy interlacing bundles of smooth muscles were mixed with mature adipocytes.

## CONCLUSION

Thorough knowledge of the variants and degenerative changes in leiomyomas are mandatory

to prevent misdiagnosis and stress to the patient. Secondly to stratify patients who needs follow up.

## AUTHORS' CONTRIBUTION

SN, AR: Conceptualization, literature search & write-up. AR, FJ, SN: Data collection, analysis, interpretation & proof reading. NA: Data interpretation, proof reading and supervised the study.

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