

A Study On The Histopathological Spectrum Of Various Tumours Identified At Autopsy: A Retrospective Three Year Study At A Tertiary Care Centre.

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I. Introduction

Autopsy, an essential procedure in the medical field, provides a unique and comprehensive insight into the accurate cause of death, thereby validating clinical diagnoses and uncovering hidden diseases. Despite substantial advances in diagnostic imaging, molecular pathology, and laboratory techniques, there remain notable discrepancies between clinical assessments and autopsy findings. This is particularly true in the detection and characterization of tumours, both benign and malignant. Tumours often present diagnostic challenges during life due to their diverse clinical presentations, sometimes asymptomatic nature, and the inherent limitations of existing diagnostic technologies. Neoplasms can be benign, premalignant or malignant. Understanding the spectrum of neoplasms detected in autopsy is crucial for several reasons: it helps in understanding the epidemiology of cancers, provides insights into missed diagnoses, and guides improvements in clinical diagnostics and treatments.

Histopathological examination of tumours detected at autopsy offers a critical window into the true prevalence, types, and characteristics of neoplasms that may go undetected or misdiagnosed during a patient's life. By reviewing autopsy reports, researchers can uncover patterns in tumour occurrence, understand the limitations of current diagnostic modalities, and ultimately contribute to the advancement of medical practice and patient care.

II. Aims & Objectives

This retrospective study has been conducted with the following aims and objectives in mind:

- To study the autopsy specimens and identify various tumours
- To determine the histopathological spectrum of these tumours

III. Materials And Methods

A retrospective study was done of all the autopsy specimens sent for histopathological examination during the period of 3 years (May 2021-April 2024) to the Department of Pathology, Gauhati Medical College and Hospital, Guwahati.

In this study, all autopsy organ specimens submitted for histopathological examination were analyzed. Following routine processing, staining, and histopathological evaluation, specimens in which incidental and prediagnosed tumors were detected were included.

Relevant data and history, post-mortem findings, and gross examination of the specimens were recorded. Additional data collected encompassed age, sex, tumor location, histopathological diagnosis (benign or malignant, primary or metastatic), and other pertinent information.

Inclusion Criteria

All autopsy specimens submitted to the Department of Pathology at Guwahati Medical College and Hospital between May 2021 and April 2024, which revealed tumor findings upon histopathological examination, were included in this study.

Exclusion Criteria

1. Autopsy specimens with an equivocal histopathological diagnosis were excluded.
2. Specimens not preserved in proper fixative or completely autolysed specimen were excluded from the study.

IV. Results:

The present study consists of 27 cases out of 700 cases (3.8%) sent for histopathological examination in the Department of Pathology, Gauhati Medical College and Hospital. All the cases where a diagnosis of tumour was made has been included in the study. The cases where the tissue were autolysed and where a diagnosis of tumour was not made has not been included in the study.

Out of total 27 cases, 11 were females and 16 were males. The majority of the patients were between the age group 41-60 years. Malignant tumours were also most common in the age group of 41-60 years.

Most common benign lesion was found to be leiomyoma (5/27; 19%) and the most common malignant lesion was adenocarcinoma (9/27; 33%). Rest consisted of 4 cases of squamous cell carcinoma, 3 cases of hepatocellular carcinoma, one case each of follicular adenoma of thyroid, mature cystic teratoma of ovary, glioblastoma, high grade urothelial carcinoma of bladder and clear cell renal cell carcinoma of kidney.

Out of the 27 cases with neoplasms, 11 were females and 16 were males. All benign tumours were found in females only. Out of the 20 malignant tumours in our study, 16 cases were seen in males and 4 cases were in females.

Adenocarcinoma was the most common malignant tumour in our study (n=10). Out of 10 adenocarcinomas, 5 were metastatic and 5 were primary. Stomach and lung primary were mostly seen.

Squamous cell carcinoma was the second most common malignant tumour in this study consisting of 4 cases of which two were primary and two were metastatic. Out of the two primary SCC cases, one was Carcinoma Penis and another was Carcinoma lung.

Hepatocellular carcinoma was third in order among the malignant tumours studied in this series (n=3). One of the hepatocellular carcinoma case was found to be associated with cirrhotic liver.

Leiomyoma was the most common benign neoplasm (n=5) found exclusively in females; uterus being the most common site.

A single case of Glioblastoma was reported which was previously undiagnosed. The patient was a 19 year old girl, who had a history of persistent headache and had one episode of loss of consciousness following which she was declared brought dead in the casualty department of Gauhati Medical College and Hospital. Portion of brain, lung, liver, spleen and kidney were sent for histopathological analysis. Autopsy revealed a ruptured cyst with papillary-like projections located in the frontal lobe. Grossly, we received a portion of brain measuring 11x9x5 cms, grayish white in color, showing multiple papillary like projections in the frontal lobe aggregate measuring 3x1.5x1 cms. On cut section of the mass, it is friable and grayish white in color. Microscopically, sections studied from the portion of brain shows a tumour with increased cellularity. Nuclei of the neoplastic cells are hyperchromatic and elongated with irregular nuclear membrane. There are areas of microvascular proliferation and focal areas of necrosis with perinecrotic pseudopallisades. The findings were suggestive of glioblastoma multiforme. Sections from portion of both the lungs showed features of pneumonitis. Sections from the liver showed features of chronic hepatitis. Sections from the spleen and kidney were unremarkable.

Histopathological Type Of Various Tumours And Their Relative Frequencies:

Table 1a: showing the histopathological typing and the relative frequencies of various tumours

Tumours	No. of cases	Percentage%
Leiomyoma	5	18.5%
Follicular Adenoma	1	3.7%
Mature cystic teratoma	1	3.7%
Squamous cell carcinoma	4	14.8%
Urothelial carcinoma	1	3.7%
Adenocarcinoma	10	37%
Hepatocellular Carcinoma	3	11.1%
Glioblastoma	1	3.7%
Renal cell carcinoma	1	3.7%

The most common tumour encountered was adenocarcinoma (n=9, 37%), followed by leiomyoma (n=5, 18.5%), squamous cell carcinoma (n=4, 14.8%), hepatocellular carcinoma (n=3, 11.1%) and one case

(n=1, 3.7%) each of glioblastoma, renal cell carcinoma (clear cell type), high grade urothelial carcinoma, follicular adenoma and mature cystic teratoma.

Benign Vs Malignant Tumours:

Table 1b: showing the histopathological nature of the various tumours

Tumours	No. of cases	Percentage%
Benign	7	26%
Malignant	20	74%
Total	27	100%

OBSERVATION: It was observed in our series that malignant tumours (74%) outnumbered benign tumours (24%).

Primary Vs Metastatic Malignant Tumours:

Table 1c: showing the primary and metastatic malignant tumours

Type Of Malignant Tumour	No. Of Cases	Percentage%
Primary	9	45%
Metastatic	11	55%
Total	20	100%

OBSERVATION: It was observed in our series that malignant metastatic tumours (55%) outnumbered primary malignant tumours (45%).

Sex Distribution Of Various Tumours :

Table 2: showing the sex distribution of all the cases of tumours

Sex	No. of cases	Percentage%
Male	16	59%
Female	11	41%
Total	27	100%

Observation: There seems to a slight preponderance of the tumours among male patients as a whole. Out of 27 cases, females comprised 11 (41%) cases and males comprised 16 (59%) cases. The male to female ratio was found to be 1.4 : 1.

Age Wise Distribution:

Table 3: showing the age wise distribution of benign and malignant tumours

Age Group	Benign	Malignant
0-20	0	1
21-40	4	3
41-60	2	10
61-80	1	6

observation : The malignant tumours were most common in the age group of 41-60 years.

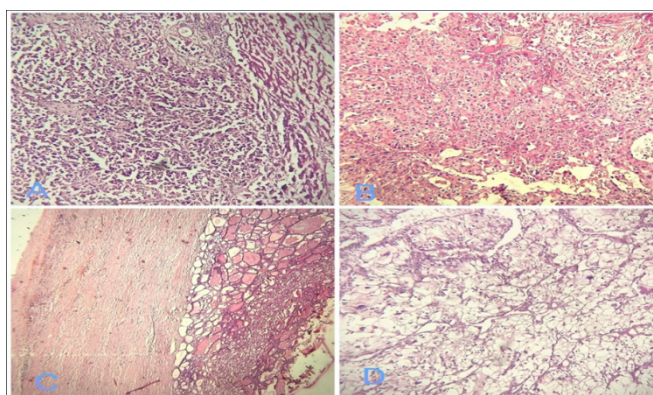


Fig :1 A) Hepatocellular Carcinoma Showing Malignant Hepatocytes Showing Nuclear Atypia Arranged In A Trabecular Pattern And With Increased Mitotic Activity (H&E, X100). 1 B) High Grade Urothelial Carcinoma Showing Markedly Pleomorphic Urothelial Cells With Pronounced Nuclear Atypia And

Invasion Into The Surrounding Muscularis Propria (H&E, X100). 1 C) Follicular Adenoma Of The Thyroid Revealing Well-Circumscribed Encapsulated Nodule, Composed Of Uniform Thyroid Follicular Cells Forming Follicles Of Varying Size Without Evidence Of Capsular Or Vascular Invasion (H&E, X100). 1 D). Clear Cell Renal Cell Carcinoma Displaying Nests Of Tumour Cells Having Clear Cytoplasm Separated By Thin Walled Vessels (H&E, X100).

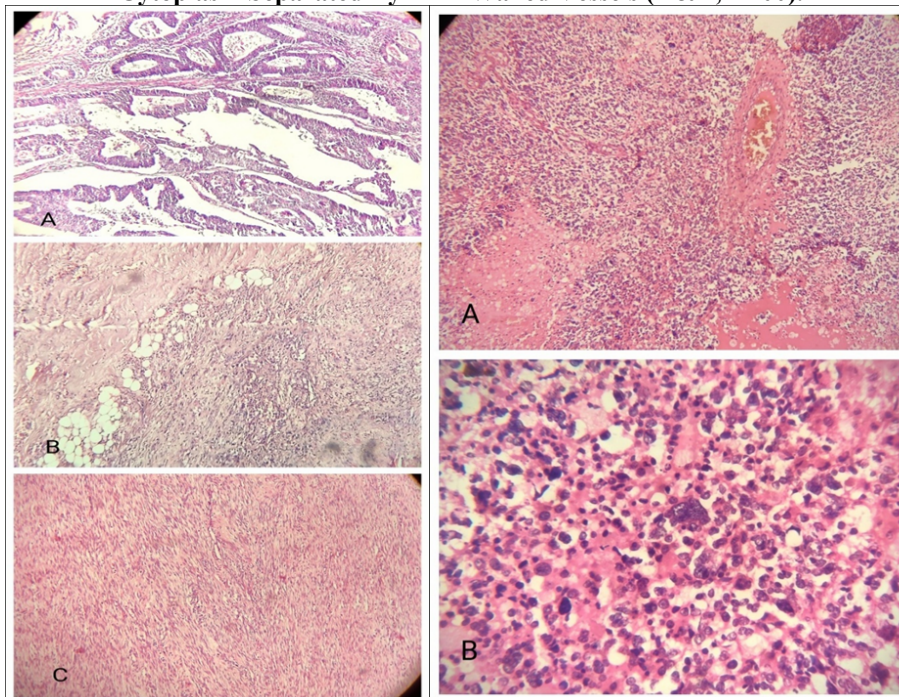


Fig : 2 A) Adenocarcinoma Showing Moderately Differentiated Glands With Marked Cellular Atypia And Hyperchromasia (H&E, X100). 2 B) Metastatic Squamous Cell Carcinoma Showing Nests Of Atypical Squamous Cells With Infiltration Into The Cardiac Myocytes (H&E, X100). 2 C) Leiomyoma Showing Monotonous Spindle Cells Arranged In Intersecting Fascicles Without Cellular Atypia (H&E, X100).

Fig: 3 A) Glioblastoma Multiforme Showing A Cellular Tumour With Focal Areas Of Necrosis Including Perivascular Pseudopalisading Characterized By Tumour Cells Surrounding Central Necrosis (H&E, X100).

3 B) In High Power View , Glioblastoma Multiforme Showing Highly Pleomorphic Cells With Nuclear Atypia, Prominent Nucleoli And Presence Of Atypical Mitotic Figure (H&E, X400).

V. Discussion

Histopathological examination in medicolegal autopsies is conducted to find the cause of death when forensic expert suspects the morphological changes found in tissues are related to death. ^[1]

In our present study, adenocarcinoma comprised the most common tumour in general and also the most common malignant tumour which is similar to a study done by Chaurasia et al. ^[2] in North India and Mohan et al in South India ^[3]. The most common adenocarcinoma were metastatic which were mostly to the liver (4 cases) and to the uterus (1 case).

Squamous cell carcinoma was the second most common malignant tumour in our study consisting of 4 cases of which two were primary and two were metastatic. Out of the two primary SCC cases, one was located in the Penis and the other affected the lung. The same penile carcinoma also had metastasized to the heart and the pericardium. Penile squamous cell carcinoma usually spreads as follows: sentinel inguinal node(s), superficial inguinal lymph nodes, deep inguinal lymph nodes, pelvic lymph nodes, periaortic lymph nodes, mediastinal lymph nodes, regional dissemination to skin of groin, scrotum, perineum, direct invasion of prostate, and systemic dissemination to multiple sites like liver, lungs, and heart. ^{[4],[5]}

Comparable results are shown by Lanjewar et al ^[6]. They found squamous cell carcinoma and adenocarcinoma at various sites as most common among neoplasms.

Leiomyoma of the uterus was found to be the most common benign tumour observed in our study which is similar to another study done by Mohan et al in South India ^[3]. In the living also, leiomyoma is the most common benign tumour found in females of reproductive age group ^[7]. Larger fibroids are known to carry increased risk of morbidity and mortality^[8] with some of them undergoing degenerative changes as well.

A single case of Glioblastoma was also noted in our study which was previously undiagnosed. Sudden death from an undiagnosed primary intracranial neoplasm is an exceptionally rare event, with reported frequencies in the range of 0.02% to 2.1% in medico-legal autopsy series and only 12% of all cases of sudden unexpected death due to primary intracranial tumours are due to glioblastomas^[9].

Another case of incidental renal cell carcinoma was found in our study which was previously diagnosed as chronic kidney disease. The classic triad of flank mass, flank pain and hematuria which is usually the presenting feature in renal cell carcinoma, is found only in 5-10% of the cases^[10] and was not seen in this case ante mortem. The incidence of renal tumors at autopsy is approximately 2%^[11]. The histopathological subtype of renal cell carcinoma in this study was of the clear cell type, which is the most common subtype, comprising of 90% of all kidney tumours.^[12]

In this study, 3 cases of Hepatocellular carcinoma were found, one of which was associated with cirrhotic liver. Hepatocellular carcinoma (HCC) is the third leading cause of cancer-related death worldwide and a leading cause of mortality among cirrhotic patients^[13]. The most recent studies examining the epidemiology and metastatic patterns of HCC in autopsy date back to the early 1990s^{[14],[15]}.

The M : F ratio in this study was 1.4 : 1. Sinhasan et al. have also shown a male predominance among tumors detected in autopsy specimens^[16].

VI. Limitations

The number of cases in our present study are very few, hence a longer duration study would contribute to more number of cases.

Moreover, as the study was conducted in autopsy cases, IHC markers were not done in all cases for further confirmation of the diagnosis.

VII. Conclusion

In conclusion, our study on the histopathological spectrum of tumors detected at autopsy over a three-year period has provided significant insights into the prevalence and types of neoplasms present in this population. These findings underscore the diversity and complexity of tumor pathology in autopsy cases and highlight the importance of thorough post-mortem examinations in understanding the epidemiology and histopathological characteristics of tumors. Few of these tumors could have gone unnoticed in the antemortem period, but autopsy complemented with histopathology has proved to be helpful in unveiling those, which are otherwise unusual for a pathologist to encounter in the routine practice. Further research and continuous surveillance are essential to deepen our comprehension of tumor biology and to improve diagnostic and therapeutic strategies in clinical practice.

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Conflict of interest

None

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