



INCIDENTAL TUMORS DETECTED AT MEDICOLEGAL AUTOPSIES- A RETROSPECTIVE STUDY

Pathology

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ABSTRACT

The autopsy study aids to the knowledge of pathology by unveiling the rare lesions which are a source of learning from a pathologist's perspective. Some of them are only diagnosed at autopsy as they do not cause any functional derangement during the life of a person. These findings have proved to be of great academic value and serve as an eye opener to the infrequent lesions which go unnoticed when a person is alive. The medicolegal autopsy forms an opportunity to study not only medically diagnosed and treated neoplasms, but also the natural evolution of untreated disease. Many incidental autopsy findings have proven to be great learning tools for the pathologists as well as the forensic expert. This retrospective study emphasizes the various incidental and interesting benign and malignant tumors detected surprisingly while doing autopsies, which otherwise would have been unnoticed during a person's life. The study highlights importance of detailed histopathological examination of autopsy specimens, thereby providing clue to the probable cause of death. The results of such studies are important for accumulation of mortality statistics which are essential for public health planning.

KEYWORDS

Autopsy, Benign, Malignant, Tumors, Incidental.

INTRODUCTION:

The term "autopsy" is derived from the Ancient Greek *autopsia*, means "to see for oneself", *autos* ("oneself") and *opsis* ("eye").^[1] An autopsy also known as a post-mortem examination, is a highly specialized surgical procedure that consists of a thorough examination of a corpse to determine the cause and manner of death and to evaluate any disease or injury that may be present.^[2] A handful of histopathological findings unrelated to the cause of death are noticed in routine histopathological examination of medicolegal autopsies. These findings have proven to be of great academic value and serve as an eye opener to the infrequent lesions which go unnoticed when a person is alive. The medicolegal autopsy forms an opportunity to study not only medically diagnosed and treated neoplasms, but also the natural evolution of untreated disease.^[3] Autopsy also aids in the diagnosis of undiagnosed or misdiagnosed malignant tumors irrespective of underlying cause of death, which may or may not be related to malignancy.^[4] But many incidental findings have been highlighted on histopathological examinations which have proven to be great learning tools for the pathologists as well as the forensic expert.

We conducted a retrospective study which highlights the various incidental tumors noticed during medicolegal autopsies carried out for some other conditions. The outcome of the study will help to gain the knowledge that aids in academic and research learning purpose. Histopathological examination is important for accumulation of mortality statistics which are essential for public health planning and to improve future health guidelines and recommendations.

Research Hypothesis: Medicolegal autopsies may reveal incidental tumors that go unnoticed when a person is alive.

Aims and Objectives:

1. To determine the incidence of tumors (benign and malignant) detected incidentally in medicolegal autopsies during study period
2. Finding association of these tumors as related or unrelated to the cause of death.
3. To highlight various other pathological lesions encountered in these selected group of cases.

Inclusion criteria:

1. All medicolegal autopsies where tumor (benign or malignant) is diagnosed incidentally while performing autopsy forms the study group.

Exclusion criteria:

1. Completely autolyzed tissues where definitive microscopy opinion was not possible
2. All other postmortem reports where tumor is not detected

Methodology:

A retrospective descriptive study of all the medicolegal autopsies for two years was conducted in the Department of Pathology, in a tertiary care hospital, after obtaining clearance from Institute Research and Ethical committee.

The organs relevant to the case concerned were sent for histopathological examination by the forensic expert after completing the autopsy at mortuary. In most of the cases, heart, liver, spleen, kidneys, brain and lungs were sent in 10% formalin. Sometimes tumor masses were detected while carrying out post-mortem examination. Representative bits from the concerned organs were processed in a routine manner after describing the gross specimen findings. Histopathology sections were stained with routine hematoxylin and eosin (H & E) stain and special stains were used as and when required. Morphological findings of all the organs sent were recorded. The gross and microscopic findings were taken into consideration. Conclusions were drawn by considering various gross and microscopic findings, as the most possible cause of death. A brief discussion of the salient features was carried out with the forensic expert. An attempt was done to find association of these tumors as related or unrelated to the cause of death.

Sample size:

Sample size was calculated using data from autopsy register kept in the histopathology section in the department of Pathology. The present study consists of a series of 795 autopsy cases conducted during two years of study period in our government tertiary care centre. A detailed requisition form consisting of patient identification, brief history, autopsy findings, and preliminary cause of death along with pieces of organs were received from Forensic Medicine department. Data was collected and along with gross and microscopic features were analyzed and tabulated.

Statistical analysis: Individual lesions are described in numbers and incidence in percentages.

Results:

Out of 795 autopsy cases, we encountered 32 tumors which included

13 benign and 19 malignant tumors (Table 1). Hence, neoplastic lesions accounted for 4 % of the total cases. Out of 32 cases, males comprised of 18 cases and females 14 cases with mild predominance of males. Age ranged from 5 days old newborn (with Nephroblastoma in

bilateral kidneys) to 82 year old (known chronic smoker with lung cancer). Most common organ involved is female genital system (9 cases) followed by renal system (8 cases). Table2 shows details of organs involved by the tumors.

Table1. Shows various tumors found incidentally during routine autopsy.

Sl no	Age /Sex	Alleged cause of death	Tumor found during autopsy	Other significant findings
1	55yr/M	Sudden death at home	Clear cell carcinoma kidney	Old myocardial infarct in heart
2	45yr/M	Brought dead by police	Papillary renal cell carcinoma- kidney	Diffuse alveolar damage, Healed Myocardial infarction
3	67yr/M	Suicide by rat killer poison	Angiomyolipoma of lung	Fatty liver, acute tubular necrosis-kidney
4	34yr/M	Blunt force injury to head	Pulmonary vascular hamartoma	Lung: Chronic venous congestion
5	58yr/M	Suicide by Hanging	Squamous cell carcinoma-Larynx	Fatty liver
6	56yr/F	Sudden death at home	Broad ligament leiomyoma	Fatty liver, Chronic pyelonephritis
7	70yr/F	Found dead at home	Endometrial Adenocarcinoma	Liver showed metastasis
8	50yr/F	Sudden death at home	Infiltrating Ductal Carcinoma- Breast	Metastasis to lung, liver, kidney & heart
9	37yr/F	Rat killer poisoning	Intramural leiomyoma	Pulmonary edema
10	70yr/M	Death due to self fall	Follicular adenoma of Thyroid	Diffuse pulmonary edema
11	50yr/M	Sudden death at home	Small cell carcinoma of lung	Tumor direct spread to heart
12	50yr/F	Death after developing ascitis	Linitis plastica with Krukenberg's tumor	Tumor metastasis to ovaries, lungs and heart
13	43yr/M	Brought dead to casualty	Squamous cell carcinoma-Esophagus	Lymph node metastasis, Chronic Gastritis
14	24 yr/F	Suicide by Hanging	Dysgerminoma Ovary -Left ovary	Polycystic ovarian disease of right ovary
15	57yr/M	Found dead at home	Cavernous hemangioma-Kidney	Miliary Tuberculosis -Lungs, Fatty liver
16	65yr/M	Found dead by police	Squamous cell carcinoma- Larynx	Bronchopneumonia in both Lungs
17	50yr/M	Suicide by Hanging	Chondromyxoid fibroma of Jaw bone	Fatty liver
18	60yr/M	Found dead by police	Squamous cell carcinoma - Larynx	Metastasis to regional lymph nodes
19	82yr/F	Sudden death at home	Adenosquamous carcinoma of lung	Metastasis to regional lymph nodes
20	58yr/F	Pulmonary Tuberculosis	Liver infiltration by leukemic cells	Lung- Chronic venous congestion
21	54yr/F	Police Suspected foul play	Papillary Serous Endometrial Carcinoma	Metastasis to liver, spleen & peritoneum
22	61yr/M	Brought dead	Poorly diff adenocarcinoma Stomach	Metastasis to regional lymph nodes and had Virchow's lymphadenopathy
23	69yr/F	Found dead	Subserosal leiomyoma with secondary changes	Fatty liver
24	28yr/F	Found dead	Simple serous cystadenoma Ovary	Atherosclerosis
25	5 days/F	Found dead	Nephroblastoma- bilateral kidneys	Pulmonary edema
26	36yr/M	Brought dead	Follicular adenoma of thyroid gland	Fatty liver
27	45yr/F	Poisoning	Intramural leiomyoma	Fatty liver and atherosclerosis
28	55yr/M	Suicide by hanging	Well diff. Squamous cell carcinoma of mouth	Metastasis to regional lymph nodes
29	49yr/F	History of jaundice	Intramural leiomyoma	Cirrhosis of liver
30	67yr/M	Snake bite	Sarcomatoid Renal Cell Carcinoma	Cirrhosis of liver
31	65yr/M	Found unconscious	Renal Papillary adenoma	Old myocardial infarct in heart
32	70yr/M	Sudden death	Hepatocellular carcinoma with Cirrhosis	Alcoholic liver disease

Table 2: Organ/ system-wise tumors encountered:

Sl no	System/ Organ	Benign tumors	Malignant tumors
1	Female Genital System	Leiomyoma (5 cases) Simple serous cystadenoma-ovary (1)	Endometrial adenocarcinoma (2) Dysgerminoma ovary (1)
2	Breast	-	Infiltrating breast carcinoma (1)
3	Renal System	Cavernous hemangioma (1)	Renal cell carcinoma (3) Sarcomatoid, clear cell, papillary (one each) Nephroblastoma (bilateral kidneys)
4	Lung	Angiomyolipoma (1) Pulmonary vascular hamartoma (1)	Small cell carcinoma (1), Adenosquamous carcinoma (1)
5	Larynx	-	Squamous cell carcinoma (3)
6	Thyroid	Follicular adenoma (2)	-
7	GIT	-	Linitis plastica (1) Adenocarcinoma poorly differentiated (1) Squamous cell carcinoma- mouth (1) Esophageal carcinoma (1)
8	Bone tumor	Chondromyxoid fibroma (1)	-
9	Liver	-	Leukemic infiltration (1) HCC with Cirrhosis (1)

1. Female Genital System (FGS): Leiomyomas are the most common tumors of FGS. We encountered 5 cases of leiomyomas, 3 were intramural, 1 was subserosal and 1 was located in broad ligament. Two cases of endometrial adenocarcinomas were encountered both of which showed metastatic deposits to liver (Fig no 1).

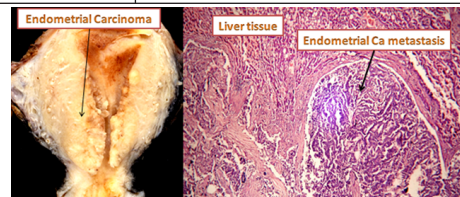


Fig No 1: Case of Endometrioid endometrial adenocarcinoma: Gross specimen showing infiltrative gray white friable tumor mass; Microscopy showed metastatic spread to liver.

2. Breast: One case of infiltrating ductal carcinoma (IDC) was encountered; history from husband revealed that patient neglected breast lump that was growing rapidly since past 6 months. Autopsy showed metastatic deposits in the liver, heart (Fig 2), kidneys as well as in lungs (Fig 3). In heart tumor cells were seen infiltrating pericardial nerve bundles, probably resulting in sudden cardiac arrest due to onset of arrhythmias.

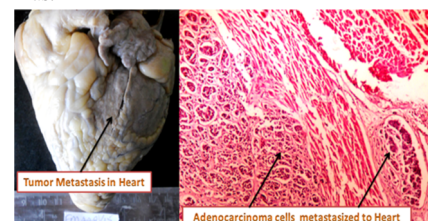


Fig no 2: IDC breast metastasis to pericardial surface of the heart. Microscopy showed tumor cells infiltrating pericardial nerve bundles as well as myocardium.

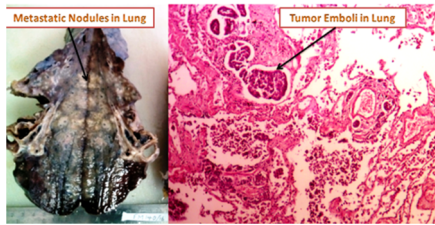


Fig no 3: IDC breast showing multiple metastatic nodules in the lung; microscopy revealed numerous tumor emboli.

3. Renal system: One case of cavernous hemangioma noticed as incidental finding in kidney. The most common malignancy noted was renal cell carcinoma accounting three cases, one was clear cell type (Fig 4), one was papillary type and one showed sarcomatoid differentiation resembling Rhabdomyosarcoma cells (Fig 5). Surprisingly none of these patients were aware about their kidney cancers and all three tumors were incidental findings during autopsies. Unfortunately one female baby of 5 days old was brought dead by the parents who were willing to know the cause of death. Hence hospital autopsy was carried out after taking written consent from parents. Autopsy revealed bilateral enlarged kidneys with gray white tumor nodules, which on histopathology showed features of Wilm's tumor with predominance of blastemal component.

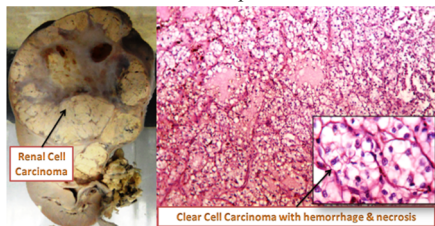


Fig no 4: Kidney showing tumor occupying predominantly upper pole and showing variegated appearance with areas of hemorrhage and necrosis. Microscopy showing features of clear cell carcinoma.

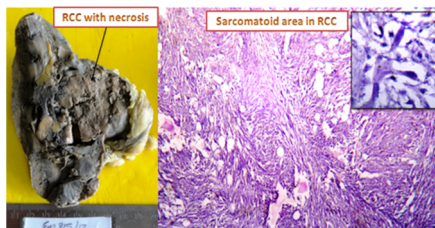


Fig no 5: Kidney showing predominantly necrotic tumor mass in the mid portion; microscopy showed sarcoma like features with malignant spindle cells arranged in intersecting bundles along with clear cell carcinoma areas.

4. Lung: Two benign hamartomatous lesions were noted in lung in two separate cases namely angiomyolipoma of lung and pulmonary vascular hamartoma. Two malignancies of lung were encountered namely small cell carcinoma and adenocarcinoma. The small cell carcinoma patient was chronic smoker aged 50 years and died suddenly at home. Clinical probable diagnosis of acute myocardial infarction was made and requested autopsy. Heart examination revealed presence of small blue round cell tumor; lung revealed oat cell carcinoma with direct spread to heart. The pericardial membrane was tightly adherent to heart and tumor cells were seen extensively infiltrating pericardial fat, nerve bundles and myocardium (Fig 6)

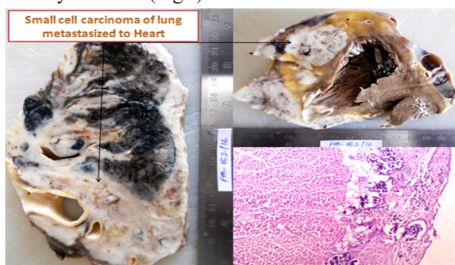


Fig No 6: Small cell carcinoma of lung showing extensive

infiltration of lung as well as direct spread to adjacent heart. Microscopy of heart showing small blue round cells infiltrating pericardium and myocardium.

5. Larynx: Three cases of laryngeal carcinomas were noted during the study period; all the three cases were males and history revealed chronic smoking. Lungs in all the three cases showed dense anthracosis. Grossly the tumor revealed friable tumor tissue in supraglottic area extending to glottis in all three cases (Fig 7). Regional lymph nodes showed metastatic squamous cell carcinoma deposits of the tumor.

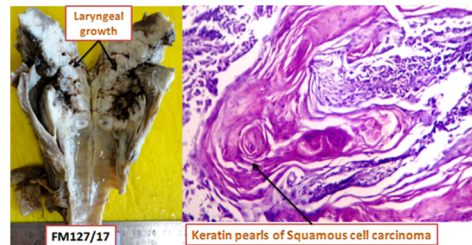


Fig no 7: Laryngeal carcinoma showing extensive local infiltration and narrowing of airway. Microscopy showing well differentiated squamous cell carcinoma with formation of keratin pearls.

6. Thyroid: One case of follicular adenoma was noticed as incidental finding in 70 year old male who died due to self fall. Tumor did not reveal any capsular or vascular invasion.

7. GIT: Four malignancies were noted in GIT. One case was chronic pan and gutka chewer who developed carcinoma of tongue and died after suicide by hanging. There was severe cancer cachexia noted and gross examination of tongue showed ulceroproliferative growth over the posterior 1/3rd of the tongue (Fig 8) extending to lateral borders on both side. Regional lymph nodes were enlarged and showed metastatic deposits of squamous cell carcinoma.

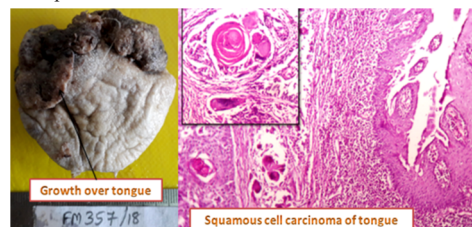


Fig no 8: Gross specimen of resected tongue showing ulceroproliferative growth involving predominantly posterior 1/3rd and extending to both the lateral margins. Microscopy revealed well differentiated squamous cell carcinoma with keratin pearls.

There were 2 cases of adenocarcinoma of the stomach. One case was 50 years old female presented with malignant ascitis and dead soon after admission. Ascitic fluid showed positive for malignancy with presence of signet ring cell adenocarcinoma. Autopsy showed diffusely infiltrative adenocarcinoma or linitis plastica with spread to bilateral ovaries which were enlarged and showed metastatic deposits thereby conforming Krukenberg tumor (Fig 9). The other case was 61 year old, severely cachexic male brought dead to hospital. Autopsy showed presence of large left supraclavicular/ Virchow's lymph node with deposits by poorly differentiated adenocarcinoma. Stomach revealed presence of primary tumor origin on autopsy.

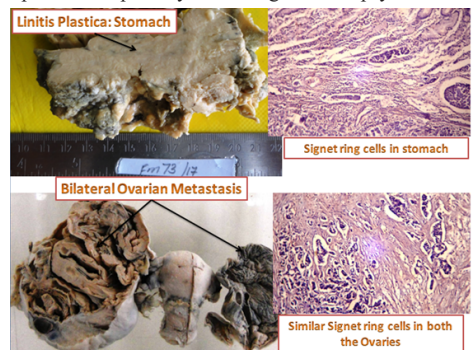


Fig no 9: Gross specimen of Linitis Plastica of stomach and Bilateral Ovarian Metastasis suggesting Krukenberg's tumor.

Microscopy in the both sites showed similar signet ring cell adenocarcinoma.

8. Bone tumor: Only one case of chondromyxoid fibroma of jaw bone was encountered in 50 year old male who was chronic alcoholic and died by suicide by hanging.

9. Liver: Most common finding in liver in almost many autopsy cases was alcohol induced steatosis and steatohepatitis. We received one case of well differentiated hepatocellular carcinoma with associated cirrhosis in a 70 year old chronic alcoholic male. One case was acute leukemia diagnosed 2 months back and liver showed infiltration of parenchyma by leukemic cells. Patient was 58 year old female and died as she was from poor socioeconomic background and did not received any treatment for her medical illness.

DISCUSSION:

Autopsies are performed for either legal or medical purposes. Giovanni Morgagni (1682–1771), celebrated as the father of anatomical pathology, wrote the first exhaustive work on pathology.^[1] By his work, Morgagni demolished the ancient humoral theory of disease and published his life time experience based on 700 postmortems and their corresponding clinical findings. He thus introduced the concept of clinicopathological correlation (CPC) establishing a coherent sequence of cause, lesions, symptoms and outcome of disease. Professor William Boyd in his unimitable style wrote "Pathology had its beginning on the autopsy table".^[2]

A handful of histopathological findings unrelated to the cause of death are noticed in routine histopathological examination of medicolegal autopsies. These findings have proved to be of great academic value and serve as an eye opener to the infrequent lesions which go unnoticed when a person is alive. The medicolegal autopsy forms an opportunity to study not only medically diagnosed and treated neoplasms, but also the natural evolution of untreated disease.^[3] Autopsy also aids in the diagnosis of undiagnosed or misdiagnosed malignant tumors irrespective of underlying cause of death, which may or may not be related to malignancy.^[4] But many incidental findings have been highlighted on histopathological examinations which have proven to be great learning tools for the pathologists as well as the forensic expert. Histopathological examination is also important for accumulation of mortality statistics which are essential for public health and health service planning.^[5]

The overall incidence of unsuspected neoplasia in studies by Sens et al.^[6] was 7% and Burton et al.^[6] with a detection rate of 9% malignant neoplasms. In our study we found 32 cases of neoplasia out of total 795 cases of autopsies that constitute 4%. In a study of 650 cases of autopsy by Shah VB et al., 5 cases of renal masses were detected incidentally which included renal cell carcinoma (RCC).^[7] We also encountered 3 cases of RCC. These cases were asymptomatic and had no symptoms related to the masses and the causes of death were unrelated to the renal masses. Jonson quoted in his study of incidental renal cell carcinomas, 110 tumors were diagnosed at autopsy with a rate of 7.1/1000 autopsies.^[8]

Various histopathological findings unrelated to the cause of death are noticed in routine histopathological examination of medicolegal autopsies. These findings which sometimes are of practically no significance to the autopsy report however may have immense academic values. Hence autopsy followed by histopathological examination remains the gold standard tool to ascertain the cause of death.

The Hospital autopsies which are also known as Academic Autopsies are performed with the consent of the relatives of the deceased to arrive at the diagnosis of cause of death where diagnosis could not be reached during the hospital stay, investigations and treatment or to confirm diagnosis where it was doubtful and are requested to determine the extent of a disease process or to evaluate therapy. Whereas the Medico-legal or Forensic autopsies are performed on the instructions of the legal authority in circumstances relating to suspicious, sudden, obscure, unnatural, litigious or criminal deaths. The number of hospital autopsies are markedly declined nowadays owing probably due to improvement in diagnostic facilities, especially in radiological field. The present study not included any of the hospital autopsies, it is only medicolegal autopsies carried out to know cause of death in a person died due to some other cause like road traffic accidents or found dead at home in suspicious manner.

Among organs received, liver is sent in almost all cases of autopsies to ascertain the cause of death. Quite rightly liver is, called as "The custodian of milieu interior" and is vulnerable to a variety of metabolic, toxic, microbial and circulatory insults.^[12] Most of the chronic liver diseases even in advanced stages may cause no prominent clinical signs and symptoms and are diagnosed only during autopsy.^[12,13] The spectrum of lesions that are reported in a series of autopsy findings of liver have reported fatty change, Chronic venous congestion (CVC), cirrhosis of liver, malignancy, hepatitis and chronic abscess, fatty change being the predominant finding.^[14] The findings in our study are comparable to these studies with fatty liver or steatosis being the commonest lesion. The importance of histopathology in autopsy studies cannot be underemphasized in understanding the disease processes involving liver.

Limitations of the study: As the study is carried out in autopsy cases, the Immunohisto chemistry (IHC) markers were not done for further confirmation of the diagnosis. IHC studies are very useful to comment on the prognosis of the malignancies, have not permitted by the institute in autopsies considering the cost factor. The study of longer duration will definitely add more number of incidental detected tumors at autopsies.

CONCLUSION:

This study has contributed a handful of findings to the pool of rare lesions in pathology. Some of these lesions encountered which served as feast to a pathologist are Krukenberg's tumor with linitis plastica, small cell carcinoma lung with direct spread to heart, Squamous cell carcinoma of esophagus, angiomyolipoma in lung, and papillary type of renal cell carcinoma. Autopsy studies help in the detection of unexpected findings significant enough to have changed patient management had they been recognized before death. Such studies highlight the significance of hospital autopsies, which are significantly reduced nowadays due to the fear fact of finding new undiagnosed medical condition by physicians. The reduction is also contributed to advancement in radiological investigations, but we should remember that radiology is mainly black and white shadows. The true importance of autopsy can't be ignored as autopsy is "lawyer for the dead" and its report is "when death speaks". Such retrospective and prospective studies also provide an insight into the true prevalence of diseases or lesions. Histopathologic study in autopsies is invaluable in the detection of these unsuspected neoplasms and evaluating the cause of death, also aiding to the true cancer incidence statistics.

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