Tumor and tumor like lesions detected in autopsy specimens- A six year study done in a tertiary care hospital

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Abstract
Aim: *The objective of this study was to analyse the different tumours and tumour like lesions detected in post mortem specimens we received in our institute over a period six years.*

Methods: *Our research is a descriptive observational study of tumour and tumour like pathologies detected in the post mortem specimens received over a 6 year period from Jan 2011 to Dec 2016 in the Pathology department, of our institution.*

Results: *A total 104 autopsy cases received in our department during this study period, were found to have presence of tumor or tumor like lesions. Among the 104 cases, 72 were non neoplastic lesions accounting for 69.2% cases and the remaining 30.8% were neoplasms. The age range was from 1month to 86 years with the maximum cases (23%) in the seventh decade. Mimickers of neoplasms detected were Tuberculoma inflammatory pseudo polyp, extramedullary hematopoiesis and diverticulum of small intestine. Leiomyoma, fibroma, thymoma and mature cystic teratoma comprised the benign category. The malignant lesions included are, renal cell carcinoma, metastatic adenocarcinoma, malignant thymoma and sarcoma.*

Conclusions: *Non neoplastic lesions constituted the majority (69.2%) in our study. In the neoplastic category, benign tumors constituted the majority, 18.3% of the total cases. The remaining 12.5% were malignant neoplasms, of which renal cell carcinomas was the single largest group accounting for 2.9% of the total cases. The results of our study were comparable with other similar studies.*

Keywords: *non-neoplastic lesions, benign, neoplasms, malignancy, Postmortem.*

Introduction

Post mortem studies are of great value and they help in revealing many undiagnosed neoplastic and non neoplastic pathologies. A detailed general examination and diligent sampling of suspicious lesions is of utmost importance in detecting many pathological lesions.

Morphological findings which are unrelated to the cause of death may be noticed in routine examination of medicolegal autopsies. These findings can be of great academic value and help to study the infrequent lesions which go undetected in a person's life.[1] The medicolegal autopsy serves as an opportunity for studying not only medically diagnosed and treated neoplasms, but also the natural evolution of untreated disease.[2] Autopsy also aids in the diagnosis of undiagnosed or misdiagnosed malignant tumours irrespective of underlying cause of death, which may or may not be

related to malignancy.[3] Histopathological examination is also important for assessing statistics of mortality which are essential for public health and health service planning.[4]

Methods

The present study is a descriptive analysis of autopsy cases were tumor and tumor like lesions were detected over a period of six years from January 2011 to December 2016 in the department of pathology government medical college, Kottayam, a tertiary care centre in south India. All types of neoplasms and tumor like lesions identified in the autopsy material were included in our study. Some cases were diagnosed clinically but in certain cases neoplasms were detected only after autopsy. The Haematoxylin & Eosin stained slides were analyzed and serial sections were taken in relevant cases. The relevant clinical details and imaging findings were retrieved from the data entered in the registers.

This study was approved by the Institutional Review Board of our college. Data analysis was done using SPSS 16 software and the frequency tables were calculated.

Objectives

1. To study the tumours and tumour like lesions in autopsy specimens received at Department of Pathology, Government medical college, Kottayam.
2. To describe the common tumors detected in postmortem cases at Government medical college, Kottayam.

Type of Study: Descriptive observational study.
Study Setting: Dept of Pathology, Govt. Medical College, Kottayam.
Sample Size: Sample size is calculated by the formula

$$N = \frac{4pq}{d^2}$$

N = sample size   p= prevalence / proportion in previous study   q= 100-p   d= precision / allowable error

Study Tools

1. Specimen requisition form
2. Instruments to take bits of tissues to be studied.
3. Reagents for tissue processing.
4. Instruments for making paraffin blocks and cutting thin sections from it.
5. Eosin- Haematoxylin stain
6. Glass slides and cover slips for mounting.
7. Microscope
8. Detailed proforma in each case

Study Procedure

Clinical details of each case were obtained from the specimen requisition forms. Specimens were fixed in 10% formalin. After 24 hours of formalin fixation and processing, 4 micron thick sections were made from paraffin embedded blocks and stained with Eosin and Haematoxylin.

Data was entered in MS-EXCEL and analysed using SPSS software. Outcome variable is expressed in terms of frequency and percentage.

Inclusion criteria- All post mortem cases where tumors or tumor like masses are detected during autopsy in forensic department, Government medical college, Kottayam.

Exclusion criteria Markedly autolysed or decomposed cases where proper histopathological diagnosis is not possible.

Results

A total 104 autopsy cases received in our department during this study period, were found to have presence of tumor or tumor like lesions. Among the 104cases, 72 were non neoplastic lesions accounting for 69.2% cases and the remaining 30.8% were neoplasms.

The age range was from 1month to 86 years with the maximum cases (23%) in the seventh decade (Figure 1). The male : female ratio was 1.6:1 with 61% of cases in males and 39% in females.
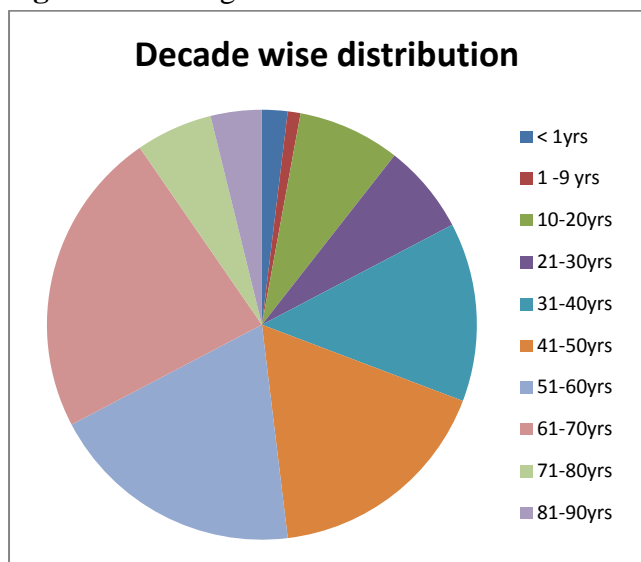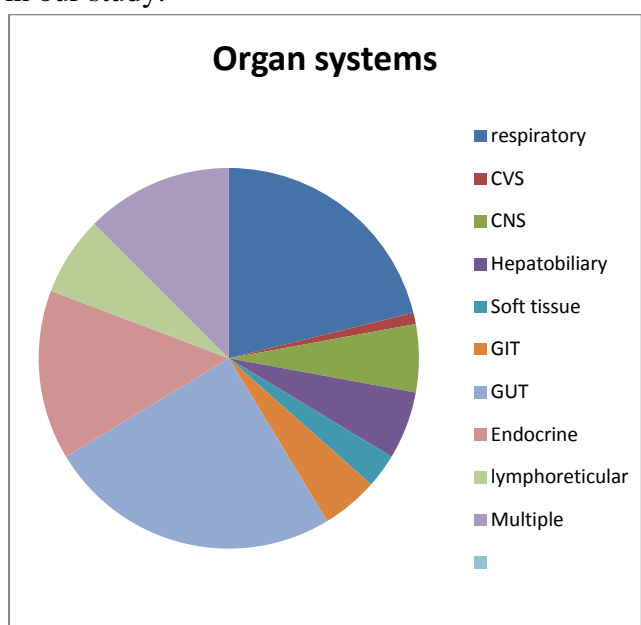
Figure 1 showing decade wise distribution of cases

Decade wise distribution

- < 1yrs
- 1 -9 yrs
- 10-20yrs
- 21-30yrs
- 31-40yrs
- 41-50yrs
- 51-60yrs
- 61-70yrs
- 71-80yrs
- 81-90yrs

Table 1 Relative frequency of pathologic lesions detected in autopsy specimens

Type of lesion	Number of cases	% of cases
Reactive/Non neoplastic	72	69.2%
Benign	19	18.3%
Malignant	13	12.5%

The tumour like lesions accounted for the majority of lesions (69.2%), followed by benign neoplasms (18.3%). Malignancies constituted 12.5% of the total. (Table 1). The main systems with histopathological findings are shown in Figure 2.

Figure 2 Main systems with pathological findings in our study.

Organ systems

- respiratory
- CVS
- CNS
- Hepatobiliary
- Soft tissue
- GIT
- GUT
- Endocrine
- lymphoreticular
- Multiple

The non neoplastic lesions were chronic pancreatitis, granulomatous lesions like tuberculoma, inflammatory polyps etc. [Table 2] Benign cystic teratoma, leiomyoma, and fibroma comprised the benign category. The malignant ones were metastatic adenocarcinomas, renal cell carcinoma and sarcomas.

Table 2 shows the Reactive (Non neoplastic) lesions

Non neoplastic lesions	Frequency	Site	Histopathology
Worm mass	1	Appendix	Helminthic appendicitis
Diverticulum	2	Small intestine	Diverticulitis with gangrene
Nodular mass/ Choristoma	1	Small intestine	Ectopic pancreas
Mesenteric mass	1	Mesentry	Necrotizing granuloma
Multinodular goiter	4	Thyroid	Multinodular goiter with degeneration
Pneumonia	12	Lung	Pneumonia
Tuberculoma	3	Lung	Caseating granuloma with cavity
Granulomatous lesion	10	Lung, liver,intestine	Multiple granulomas with caseation (7 cases) Non caseating(3 cases)
Bronchiectasis	1	Lung	Bronchiectatic cavity with caseating granuloma
Simple cyst	4	Liver kidney	Simple Hepatic cyst Renal cortical cyst
Hydatid cyst	1	Interventicular septum of heart	Hydatid cyst
c/c pancreatitis	11	Pancreas	Chronic pancreatitis with calcification & dysplasia
Abcess	3	Retroperitoneum	Suppurative lesion
Polyp	3	Colon ,ileum Endometrial	Inflammatory pseudo polyp endometrial polyp
Lymphoid hyperplasia	1	Ileum	Lymphoid hyperplasia
Hematoma	2	Subdural space	Sub dural hematoma
Stricture	2	Colon,ileum	sricture with gangrene
Multiple Nodules	4	Liver	Cirrhosis with dysplasia
Xanthoma	1	Liver	Xanthoma
Xanthogranulomatous inflammation	2	Kidney Ovary	Xathogranulomatous pyelonephritis xanthogranulomatous oophoritis
Splenomegaly	2	Spleen	Extramedullary hematopoiesis
Colloid cyst	1	Brain	Colloid cyst of third ventricle

Benign neoplasms

Benign neoplasms detected in the different organs are given in Table 3.The gross specimens of all were well circumscribed masses.

Table 3 Benign neoplasms detected in autopsy specimens

Benign	Frequency	Site	Histopathology
Leiomyoma	9	Uterus , esophagus	Leiomyoma
Mature cystic teratoma	2	Ovary ,Sacrco ccyx	Benign cystic teratoma
Sexcordstromal tumor/Fibroma	1	Ovary	Fibroma
Epithelial tumor	1	Ovary	Serous cystadenoma
Thymoma	1	Thymus	Type A thymoma
Meningioma	2	Meninges	Fibroblastic meningioma, Meningiothelial
Pituitary tumor	1	Pituitary	Adenoma
Adrenal tumor	1	Adrenal	Myelolipoma
Adrenal tumor	`1	Adrenal	Ganglioneuroma

Malignant neoplasms

In the category of malignant lesions renal cell carcinoma constituted the largest category (2.9%), followed by, adenocarcinomas (1.9.%) and other malignant neoplasms. The malignant tumors detected are shown Table 4.

Table 4 shows the malignant tumors detected

Malignancy	Frequency	Site	Histopathology
Metastatic Adenocarcinoma	1	Aorta	Adenocarcinoma mets
Adenocarcinoma	2	Colon Retroperitoneum	Adenocarcinoma Adenocarcinoma mets
Renal cell carcinoma	3	Kidney	Multilocular cystic RCC Clear cell RCC
Sarcoma	1	Pancreas	Primary sarcoma
Carcinoma pancreas	1	Pancreas	Ductal adenocarcinoma.
Germ cell tumor	1	Mediastinum	Germ cell tumor
Rhabdoid tumor	1	Extrarenal	Rhabdoid
Embryonal sarcoma	1	Liver	Embryonal sarcoma
Plasma cell dyscrasia	1	Spleen	Plasma cell neoplasm
Thymic carcinoma	1	Thymus	TypeC Thymoma with invasion

Discussion

Performance of a thorough autopsy on apparent natural deaths can provide invaluable information by identifying public health risks and monitoring disease trends. Histopathologic study in autopsies is of great value in detection of unsuspected neoplasms and evaluating the cause of death, also aiding to the true cancer incidence statistics.[1]Many incidental findings detected on histopathological examinations have proven to be great learning tools for the pathologists as well as the forensic expert.

Of the total 104 cases in our study the majority was in seventh decade, with age range between 1 month to 98 yrs. Male:female ratio was 1.6:1.The majority of lesions were in genitourinary system 25%(26 cases),followed by cardiovascular system 21%(22 cases) and endocrine system 14%(15 cases).In 13% of cases pathologic lesions were detected in multiple systems. Figure 2

The non neoplastic lesions which masequraded as tumors included granulomatous lesions, pancreatitis, Abscess, gangrene intestine, cysts and inflammatory polyps. Details are given in Table 2. We had 12 cases of tuberculosis .5 were incidentally detected but and in 4 cases the patient was already diagnosed but clinically it mimicked a mass lesion .2 cases of tuberculosis were detected as incidental findings in Patel et al s study.[1]There were 11 cases of pancreatitis of which in 1 case there was coexisting adenocarcinoma.

Another important aspect is that discordance between clinical and postmortem findings can be detected and the underlying factors leading to such discrepancies can be analysed. According to Stevanovic G the overall rate of major discrepancies was 29 per cent.[5] Malignancies were incorrectly diagnosed in 25.8% of cases.[6] Hence autopsy studies are of significance in discovering many hidden pathologies.

In Patel et al s study malignant lesions accounted for 2.47% of cases.[1] Renal cell carcinoma, Oncocytoma, carcinoid liver and an unusual pattern of tumor to tumor metastasis were some of the cases detected.[1] In the present study, 30.8% cases were neoplastic lesions and 12.5% (n=13) of the total cases were malignancies. Adenocarcinoma and renal cell carcinoma were the malignancies detected in our study. Renal cell carcinomas have been incidently detected in many autopsy studies.[1,7] Renal cell carcinomas diagnosed in post mortem

cases were found to be at a lower stage and grade compared to those diagnosed antemortem.[7]

The 16% rate of undetected neoplasia for medical autopsies and the 44% discordant clinical versus autopsy diagnosis compare favorably with other studies and emphasize the need for autopsy evaluation of the nonforensic donor.[3,8-12] Patient and family consent issues are also critical in autopsies.[14]

Limitations Expected

All autopsy cases with neoplasms may not be available for study especially if there is marked autolysis and in case of severe burns.

Conclusion

Results of the present study are comparable with other similar studies. (Table 5).Such studies may help to find out some of the undetected neoplasms and some unusual manifestations of certain pathologic lesions which will be of academic value .It might also serve as a useful study material for assessing statistics of certain malignancies.

Table 5 Comparison with other studies

	Year	Total cases	% of Malignancy
Patel et al[1]	2016	202 cases	2.47%
Burton et al[3]	1998	1105 cases M:F=1.5:1	22%(250 cases)
Wells et al[14]	1923	-	15%
Bauer et al[12]	1972	-	25%
Present study	2020	104 caes.M;F-1.6:1	13%

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