

**TO ASSESS RELATIVE PREVALENCE OF INTRA-ABDOMINAL MALIGNANCY,
ITS RESECTABILITY AND CORRELATION OF RADIOLOGIC DIAGNOSIS
WITH INTRAOPERATIVE FINDING AMONG PATIENTS OPERATED FROM
JANUARY 1, 2016 TO DECEMBER 31, 2018 IN SPHMMC, ADDIS ABABA,
ETHIOPIA**

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Abstract

Background: Intra-abdominal malignant pathology is the most common condition in our institution and so far, operation for this pathology is one of the most commonly performed procedure for all age groups and both male and female

Objective: The objective of this study was to assess relative prevalence of intra-abdominal malignancy, its resectability and correlation of radiologic diagnosis with intraoperative finding among patients operated in SPHMMC from January 1, 2016 to December 31, 2018

Method: Retrospective chart review was conducted from January 1, 2016 to December 31, 2018. Data was collected using structured questionnaire by trained data collectors. Finally data was entered to SPSS 22 for analysis.

Result: Out of 131 patients' record with intraabdominal malignant pathology, 7 of them were rejected because of incompleteness of their data. Total of 124 patients were included in the study. Majority of the patients in this study were male accounting 63.7% (79) and female accounting for 36.3% (45). The mean age of study participants was 46.53(+/- 14.175 SD). From 124 cases, pancreaticobiliary tumors were the commonest (29.0%) followed by gastric cancer (24.1%) and colorectal carcinoma (18.5%). Majority of the cases (77.5%) were advanced disease and resection was done for only 58.9%.

Conclusion: Pancreatico-biliary malignant pathology is the commonest intra-abdominal malignancy followed by gastric cancer and colorectal cancers. CT scan is superior to MRI and ultrasound in predicting the diagnosis of intra-abdominal malignancy. Most of our patients presented late and disease resectability was affected by stage of the disease.

Key words: Intra-abdominal malignant pathology, GIT cancer, Radiologic diagnosis of intra-abdominal malignant pathology, Resectability

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Acronyms and Abbreviation

A.A	Addis Ababa
ACS	American college of surgeon
ACR	American college radiology
BLH	Black lion hospital
CA	Carcinoma
CT	Computed tomography
EUS	Endoscopic ultrasound
GIT	Gastrointestinal tract
MRI	Magnetic resonance imaging
RCC	Renal cell carcinoma
SPHMMC	St. Paul`s hospital millennium medical college
US	Ultrasound
WHO	World health organisation

Introduction

Background information

The term abdominal mass refers to a mass that lies anterior to the paraspinous muscles in a region bordered by the costal margins, the iliac crests, and the pubic symphysis (1, 2, 3)

Commonly, an abnormal enlargement or mass in the abdomen comes to the clinician's attention in one of three ways: it is detected and reported by the patient, it is discovered by the clinician on physical examination, or it is noticed as an unrelated incidental finding on a radiographic study (1)

Abdominal masses are commonly addressed by surgeons, as well as by members of many clinical subspecialties. In terms of clinical importance, abdominal masses cover a broad spectrum: some have few or no apparent consequences, others significantly impair quality of life, and still others represent severe conditions that are associated with poor outcomes and high mortalities (1).

Pathology associated with abdominal masses is extensive, hence subcategorization is often helpful. Abdominal masses can often be characterized by physical examination as abdominal wall masses such as lipomas, hematomas, lymph nodes, endometriomas, and hernias or intra-abdominal masses including neoplasms and abdominal aortic aneurysms (2, 3)

Clinical decision making is influenced by whether the lesion is intra-abdominal, pelvic, retroperitoneal, or situated within the abdominal wall. In certain cases, a prompt diagnosis can be made after the physical examination, with no further investigation required; obesity, ascites, pregnancy, hernias, infection or abscess, cysts, and lipomas are examples of conditions that can generally be diagnosed at this point (1, 2).

Confirmation of the presence of the mass should be the first step in a palpable mass workup, which can often be accomplished by imaging if the physical examination is equivocal (2)

In order to diagnose intra-abdominal mass clinical evaluation of the patient gives valuable information and helps the care giver to decide how to workup the patient. Different modern imaging modalities have got important place in evaluation of the patient with abdominal mass. Ultrasound, computed tomography, magnetic resonance imaging, radiographs and fluoroscopy are the most frequently used imaging modalities in this setting (2).

Both US and CT can demonstrate the organ from which a mass arises. The accuracy of US in determining the organ of origin has been 88% to 91%, whereas CT has fared slightly better at 93%. In several studies US findings correctly suggested the pathologic diagnosis in 77% to 81% of cases, whereas CT findings suggested the diagnosis in 88% of cases. Eventhough there is no strong data showing that MRI excels CT scan in diagnosing abdominal mass, American college of radiology recommends using it for selected individuals (2, 3).

Statement of the problem

So far operation for abdominal mass is the most commonly performed procedure for all age groups and both male and female. Significant numbers of patient are dying without being operated and even after surgery done. For example, Pancreatic carcinoma is the fourth leading cause of cancer related mortality in the United States with an estimated 42 500 new cases and 35 000 deaths from the disease each year. Gastric carcinoma is the fourth most common cancer worldwide and the second most common cause of cancer-related death. From all new cancer cases, colorectal cancer accounts about 8.5% (4-6).

IN our country, Ethiopia, cancer patients are known by their late presentation after the disease is advanced. In the study done by Jonson et al, 90% of patient with gastric carcinoma had advanced disease at presentation with only 44% resectable lesion and postoperative mortality rate was 18.6% (7).

In other study done at BLH, of 437 cases, 142 oesophageal, 68 pancereato-biliary, 96 gastric, and 131 lower GIT cancers, 105 patients are not operated because of advanced metastatic disease (8)

Worldwide and also in our country, clinicians are dealing always with different cases of abdominal mass. Little has been written about the use of imaging in evaluating palpable abdominal masses in literatures. Newer reviews and case reports have focused on evaluation of specific masses using computed tomography (CT), ultrasound (US), and magnetic resonance imaging (MRI). Additionaly, there is no study in our setting correlating radiologic diagnosis with intraoperative finding and histopathologic diagnosis. So, this study will give comprehensive data in context of this country

Significance of the study

The result from this study will be used by health professionals in deciding to order the most accurate preoperative imaging modalities. It can also be used by decision makers for development of guidelines and formation of different screening tools for intra-abdominal malignancies. Data generated from this research will be used for subsequent researches.

Objective

General objective

To assess prevalence of intra-abdominal malignancy, its resectability and correlation of radiologic diagnosis with intraoperative finding among patients operated in SPHMMC from January 1, 2016 to December 31, 2017

Specific objectives

To identify relative prevalence of intra-abdominal malignant pathology

To determine proportion of resectability for operated intra-abdominal malignant pathology

To find out correlation of imaging modalities with intraoperative findings for intra-abdominal malignant pathology

To describe correlation of pre-operative and intra-operative resectability decision for operated intra-abdominal malignant pathology

Literature review

The term abdominal mass refers to a mass that lies anterior to the paraspinal muscles in a region bordered by the costal margins, the iliac crests, and the pubic symphysis (1-3)

Abdominal masses are commonly addressed by surgeons, as well as by members of many clinical subspecialties. In terms of clinical importance, abdominal masses cover a broad spectrum: some have few or no apparent consequences, others significantly impair quality of life, and still others represent severe conditions that are associated with poor outcomes and high mortalities (1).

Commonly, an abnormal enlargement or mass in the abdomen comes to the clinician's attention in one of three ways: it is detected and reported by the patient, it is discovered by the clinician on physical examination, or it is noticed as an unrelated incidental finding on a radiographic study(1)

Pathology associated with abdominal masses is extensive, hence subcategorization is often helpful. Abdominal masses can often be characterized by physical examination as abdominal wall masses such as lipomas, hematomas, lymph nodes, endometriomas, and hernias or intra-abdominal masses including neoplasms and abdominal aortic aneurysms(2)

Clinical decision making is influenced by whether the lesion is intra-abdominal, pelvic, retroperitoneal, or situated within the abdominal wall. In certain cases, a prompt diagnosis can be made after the physical examination, with no further investigation required; obesity, ascites, pregnancy, hernias, infection or abscess, cysts, and lipomas are examples of conditions that can generally be diagnosed at this point(1)

Confirmation of the presence of the mass should be the first step in a palpable mass workup, which can often be accomplished by imaging if the physical examination is equivocal (1, 2)

A total of 101 patients with a palpable or suspected abdominal mass of unknown origin were examined by computed tomography. In 69 patients an abnormality was demonstrated at the site of the palpable mass. In 32 patients no lesion was demonstrated. Such high positive and negative predictive values (99% and 97%) indicate the value of CT in determining the presence or absence of a lesion to account for a clinically apparent mass, especially when there is doubt as to its presence or organ of origin. As to the cause of the mass, CT correctly

identified the responsible organ or structure in 64 out of 69 patients with a lesion (93%) and suggested the likely nature in 61 (88%) (3).

The most common gastric malignancy is adenocarcinoma, representing over 95% of malignant tumors of the stomach. Prognosis of gastric cancer is correlated to the stage of the tumor at presentation. Therefore, accurate staging of gastric cancer is essential because surgical resection is the treatment for localized disease. CT is currently the staging modality of choice because it can help identify the primary tumor, assess for local spread, and detect nodal involvement and distant metastases (4).

Several studies have evaluated the benefit of using water as an oral contrast agent for detection and staging of gastric malignancies

Hundt et al studied 40 patients with gastric malignancies with dual-phase CT (arterial phase and venous phase) and water as an oral contrast agent and were able to detect 39 of 40 cancers (97.5%). In this study, CT staging correlated with pathologic staging in 79.4% of case (9).

Endoscopic ultrasonography is more accurate for assessing the depth of wall invasion in early cancer, but is limited in the assessment of advanced local or stenotic cancer and detection of distant metastases. Magnetic resonance imaging (MRI), although useful for staging, is not proven to be effective (10).

Hepatobiliary malignancies like HCC, gallbladder carcinoma and cholangiocarcinoma can be best approached by transabdominal ultrasound, endoscopic ultrasound, CT scan and MRI (11).

The vast majority (90%) of pancreatic cancers are malignant tumors originating from pancreatic ductal cells. Anatomically, 78% of PCs are located in the head, and the remaining 22% are equally distributed in the body and in the tail. Although PC may be detected with one particular diagnostic test, proper staging often requires the use of several imaging modalities. Trans-abdominal ultrasound is currently used as a screening test for patients with suspected PC. Its sensitivity ranges between 48% and 89%, specificity between 40% and 91%. EUS has higher sensitivity compared to CT for local tumor staging (67% vs 41%), similar sensitivity for lymph node involvement (44% vs 47%) and potential tumor resectability (68% vs 64%). CT scan and MRI have greater sensitivity and specificity in detecting pancreatic carcinoma (5, 9).

In study done by valdes et al, a total of 29 cases of RCC, the diagnosis were confirmed 100% by ultrasound and CT scan and proved CT scan precision to be quite similar with that of surgical procedure (12).

Primary retroperitoneal neoplasms are a rare but important group of neoplasms. They account for only 0.1–0.2 % of all malignancies and arise outside the retroperitoneal organs. Most primary retroperitoneal neoplasms arise from the mesodermal system with liposarcoma, leiomyosarcoma and malignant fibrous histiocytoma together, accounting for greater than 80% of primary retroperitoneal sarcomas. The remaining primary retroperitoneal masses arise predominantly from the nervous system. Cross-sectional imaging has revolutionised the investigation of patients with retroperitoneal neoplasms. Both computed tomography and magnetic resonance imaging can contribute to tumour diagnosis, though histological confirmation is often required because of the considerable overlap of imaging features (13).

Methodology

Study area.

The study was conducted in St. Paul's Hospital Mellinnium Medical College.

St. Paulo's Hospital is one of Addis Ababa public hospitals found in Gullale kifle ketema. It has a catchment population of more than 5 million. The Hospital was established in 1959 E.C by the help of Evangelical church in Germany which financed 75% of the cost of construction and equipment of this hospital. It is one of the biggest hospital and teaching institution in the country giving different residency program and undergraduate lessons. General surgery department of St. Paulo's Hospital is the fast growing department giving its both clinical and academic services by qualified personnel like General surgeons, Urologic surgeons, Transplant surgeons, Pediatric surgeon and oncologic surgeon.

Study Design

Retrospective chart review was done

Study Period

The study was conducted from January 1, 2016 to December 31, 2017

Source of Population

All patients operated for the diagnosis of intra-abdominal malignant pathology in St. Paulo's Hospital during the study period

Sampled Population

All patients operated for the diagnosis of intra-abdominal malignant pathology in St. Paulo's Hospital during the study period

Study population

All patients operated for the diagnosis of intra-abdominal malignant pathology in St. Paulo's Hospital during the study period.

Study unit

Each and every patient operated for intra-abdominal malignant pathology

Inclusion criteria and Exclusion Criteria

Inclusion criteria

All patients operated for intra-abdominal malignant pathology in the surgical department over January 1, 2016 to December 31, 2017

Exclusion criteria

Patient with incomplete-and illegible documentation on log book

Patient with intra-abdominal malignant pathology operated on emergency bases

Pediatric patients operated for intra-abdominal malignant pathology

Patient with none of preoperative US, CT scan or MRI

Patient with no well documented intraoperative finding

Sample size determination

All patients operated for intra-abdominal malignant pathology in January 1, 2016 to

December 31, 2017 was included

Sampling method

Convenience sampling method was used

Operational definitions

Abdominal mass: a mass that lies anterior to the paraspinous muscles in a region bordered by the costal margins, the iliac crests, and the pubic symphysis

Preoperative diagnosis: a working preoperative diagnosis

Postoperative diagnosis: a working postoperative diagnosis

Radiologic diagnosis: any finding written on the report of radiology department by responsible staff member.

Intraoperative finding: any intraoperative finding related to the primary patient problem documented on patient's operation note by operating surgeon

Histopathologic diagnosis: biologic diagnosis given by pathologist for specimen sent by surgeon after abdominal surgery for abdominal mass

Study variables**Independent variables**

Age, sex, occupation, smoking, alcohol use, stage of the disease

Dependent variables

Preoperative radiologic diagnosis

Intraoperative finding

Postoperative histopathologic diagnosis

Resectability of the tumor

Data quality control

Pretest was employed on 5% of the study population with structured questionnaire prior to actual data collection. Depending on this, possible amendment to the tool was incorporated. Daily evaluation of the data for completeness and encountered difficulties on the time of data collection was attended accordingly.

Data processing and analysing

Completeness of the questionnaire was rechecked preceding data entry after which it was exported to SPSS version 22 for analysis. Sentence, table of frequency and graphs was used to present descriptive data.

Ethical consideration

Letter of correspondence from institutional review board of SPHHMC was written and there was strict care for the patient's medical record and confidentiality not to take patients identification.

Result dissemination and presentation

The final research findings will be summited to SPHMMC, Department of General surgery and presented on the department research defense. Presentation on the scientific forum and Publication on the scientific journals will also be processed in the future.

Result

Over the two years of study period, 131 patients' records with intra-abdominal malignant pathology were identified from which 7 of them were rejected because of incompleteness of their data. Majority of the patients in this study were male accounting 63.7% (79) and female accounting for 36.3% (45). The mean age of study participants was 46.53(+/- 14.175 SD). Majority of the patients were from Oromia region followed by Addis Ababa.

Table 1: Socio-demographic characteristics of intra-abdominal malignant pathology from January 1, 2016 to December 31, 2018

Variable		Frequency	Percentage
Sex	Male	79	63.7
	Female	45	36.3
Residency	Oromia	59	47.7
	Addis Ababa	40	32.3
	Amhara	9	7.3
	SNNP	8	6.5
	Beneshangul gumuz	3	2.4
	Somale	2	1.6
	Gambella	1	0.8
	Afar	1	0.8
	Tigrayi	1	0.8
Age	<30	22	17.7
	31-35	9	7.3
	36-40	13	10.5
	41-45	15	12.1
	46-50	17	13.7
	>51	48	38.7

The largest share of intraabdominal malignant pathology in this study is pancreaticobiliary tumors accounting, 29.0% (36; 19 pancreatic masses and 17 biliary tract masses) followed by gastric cancer, 24.1% (30) and colorectal carcinoma, 18.5% (23).

Table 2: Relative prevalence of intra-abdominal malignant pathologies from January 1, 2016 to December 31, 2018

Variables	Frequency	Percentage
Pancreaticobiliary tumor	36	29
Gastric tumor	30	24.1
Colorectal tumor	23	18.5
Renal tumor	15	12.1
SB tumor	7	5.6
Mesenteric mass	3	2.4
Retroperitoneal mass	3	2.4
Others	7	5.6

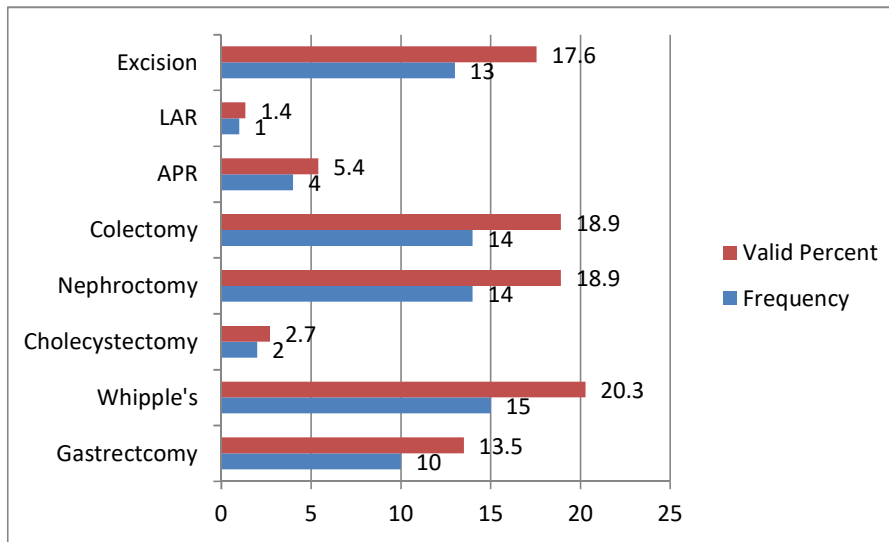
The most common imaging modalities done for these patients are Adominal ultrasound which was done for 92(74.2%) patients and CT scan for 91(73.4%) patients. MRI was done for only 22(17.7%) patients. Out of performed imaging modalities, CT scan finding was coinciding with intraoperative finding in 91.1%, MRI in 81.8% and ultrasound in 70.6%.

Preoperatively planned surgery was resection for 72.6% (90) and palliative surgery for 27.4% (34) patients. But intraoperatively, only 58.9% (73) of the tumors were found to be resectable.

Definitive surgery was done only for 73(58.9%) patients. Palliative surgery was done for 48(38.7%) patients with the rest being inoperable (2, 1.6%) and there was no intraoperative finding for one patient and no surgery was done.

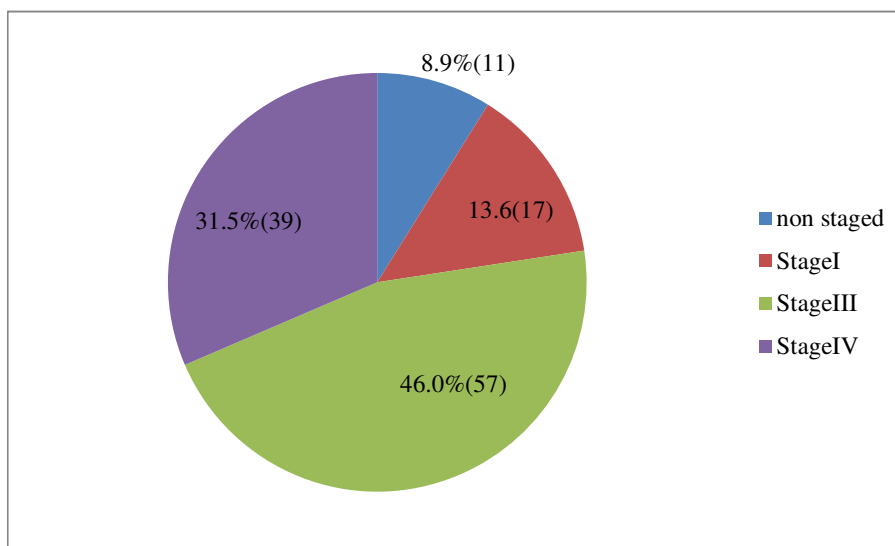
The most commonly done definitive surgery (20.3%) is whipple's procedure followed by colectomy and nephrectomy each accounting 18.9%.

Figure 1: Types of definitive surgery done for intra-abdominal malignant pathology from January 1, 2016 to December 31, 2018



Staging of the disease was not done preoperatively for 70.2% (87) patients. From preoperatively staged 37 patients, 70.3% (26) patients were having already advanced malignancies. Overall postoperative staging of patients operated for intraabdominal malignant pathology showed that majority of the patients (77.5%) had advanced disease with only 13.7 % stage II disease and staging informations were missing in 8.9% of patients.

Figure 2: Overall stages of operated intra-abdominal malignant pathology from January 1, 2016 to December 31, 2018



Discussion

The most commonly diagnosed intra-abdominal malignant pathology in this study is pancreatobiliary tumors followed by gastric cancers and colorectal carcinoma. This finding is in contrary to a research done in Black Lion Hospital in which esophageal carcinoma was the leading gastrointestinal tract cancer followed by lower Gastrointestinal tract cancers and Gastric cancer (8). This happened because of two important reasons. 1) In our hospital there was no inpatient service and no surgeries were being done for esophageal cancers. 2) The probable reason why Pancreatobiliary tumors became common in our study is the initiation of new program of hepatobiliary sub-speciality during the study period which obviously increases the number of patients of same speciality.

Computed tomography scan is considered to be excellent imaging modality for intra-abdominal masses not only for its accuracy in determining organ of origin of masses but also for assessing the extent of the disease and pathologic nature of the masses (2, 3). This is in line with our study in which CT scan is superior to MRI and Ultrasound for diagnosis of intra-abdominal malignant pathology.

Most of our patients had advanced disease (77.5%) and resection was done for majority of the cases (58.9%) but still significant numbers of cases (38.7%) were unresectable. This finding corresponds to the study done in BLH with some improvement. In the study done in BLH 83.3% of the cases were advanced with resection done for only 50% of the patients (8).

The late presentation of our patients can be partly because of difficulty of diagnosing intra-abdominal malignant pathology without modern imaging modalities which are only available in big towns of few centers and partly because of poor health care seeking behaviour of our population which is the common scenario in developing country specially for intra-abdominal malignancies.

Most of our patients had no available histopathologic diagnosis in their charts because we are sending these patients for chemoradiotherapy to BLH with their histopathology result. Additionally for most unresectable masses biopsy were not taken and still some of the patient can die or disappear without collecting the histopathology results.

Conclusion and Recommendations

Pancreatico-biliary malignant pathology is the commonest intra-abdominal malignancy followed by gastric cancer and colorectal cancers. CT scan is superior to MRI and ultrasound in predicting the diagnosis of intra-abdominal malignancy and it can be the first line of investigation for suspected intra-abdominal malignant pathology except where there is issue of radiation in which ultrasound and MRI can be used safely. Most of our patients presented late and disease resectability is affected by stage of the disease. There should be some screening methods for some of the malignancies to pick them earlier and health care seeking behaviour of our community should be improved.

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