

Diagnosis and Treatment Approaches for Intraabdominal Masses in Adults

Erişkin İntraabdominal Kitlelerinde Tanı ve Tedavi Yaklaşımları

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Aim: To evaluate patients who underwent surgery because of an intra-abdominal mass, in respect of symptoms, findings, diagnosis and treatment in accordance with information in literature.

Material and Methods: A retrospective examination was made of patients who underwent surgery because of an intra-abdominal mass between May 2010 and May 2017. For each patient a record was made of age, gender, symptoms, findings, type of mass determined, diagnostic methods used, the organ or tissue of origin, whether or not preoperative biopsy was taken, dimension of the mass, benign or malignant nature of the mass, type of operation performed and pathological diagnosis.

Results: Evaluation was made of 45 patients with an intra-abdominal mass. The patients comprised 18 (40%) males and 27 (60%) females with a mean age of 54.3 years (range, 19-86 years). The most common symptom was abdominal pain in 26 (57.8%) patients, and being able to feel the mass in the abdomen in 15 (33.4%). The intra-abdominal mass could be determined on palpation in 28 (62.2%) as a finding in the physical examination. USG was the most preferred imaging examination method in 36 (80%) patients, followed by CT in 28 (62.2%), MRI in 10 (22.2%) and PET-CT in 2 (4.4%). Preoperative endoscopy was applied to 27 (60%) patients and biopsy to 21 (46.7%). The long axis of the mass was mean 13cm (range, 4-50 cm). Treatment was applied as total excision of the mass in 29 (64.4%) patients, enbloc resection of the mass together with the bowel in 14 (31.1%), together with a distal pancreatectomy in 1 (2.2%) and together with a pancreaticoduodenectomy in 1 (2.2%). The pathology result was reported as benign in 15 (33.3%) patients and as malignant in 30 (66.7%). Of the benign masses, mesenteric cyst was determined most frequently in 5 (11.1%) patients and gastrointestinal stromal tumors (GIST) were determined as the most common malignant masses in 10 (22.2%) patients.

Conclusion: Although intra-abdominal masses originate from different organs and have different clinical and histopathological properties, they are pathologies that require systematic evaluation in respect of diagnosis and treatment approaches.

Key Words: *Intra-Abdominal Masses, Physical Examination, Abdominal Ultrasonography, Histopathological Type, Gastrointestinal Stromal Tumor.*

Amaç: Bu çalışma ile; karın içi kitle nedeni ile ameliyat edilen hastaların; semptom, bulgu, tanı ve tedavi sistematiği açısından literatür bilgileri doğrultusunda değerlendirilmesi amaçlandı.

Gereç ve Yöntem: Mayıs 2010- Mayıs 2017 tarihleri arasında karın içi kitle nedeni ile ameliyat edilen hastalar geriye dönük olarak incelendi. Karın içi kitle nedeni ile ameliyat edilen hastaların; yaş, cins, semptom, semptom, bulgu, kitlenin tespit edilme şekli, hangi tanı yöntemi ile tespit edildiği, hangi organ veya dokudan köken aldığı, ameliyat öncesi biyopsi yapıp yapılmadığı, kitlenin boyutu, kitlenin benign veya malign oluşu, hangi ameliyatın yapıldığı ve patolojik tanının ne olduğu belirlendi.

Bulgular: Çalışmaya dahil edilen karın içi kitleli 45 hastanın ortalama yaşının 54,3 (19-86) olduğu 18'inin erkek (%40), 27'sinin ise kadın (%60) olduğu görüldü. En fazla semptom 26 hastada (%57,8) karın ağrısı, 15 hastada ise (%33,4) abdomende ele gelen kitle idi. Fizik muayene bulgusu olarak 28 hastada (%62,2) palpasyonda karın içi kitle tespit edilebildi. Görüntüleme çalışmalarından en fazla tercih edilen 36 hasta (%80) ile abdomen ultrasonografi (USG) idi. USG'yi 28 (%62,2) hasta ile abdomen bilgisayarlı tomografi (BT), 10 hasta ile (%22,2) abdomen manyetik rezonans görüntüleme (MRG), 2 hasta ile (%4,4) pozitron emisyon tomografi-bilgisayarlı tomografi (PET-BT) takip etmekte idi. Ameliyat öncesi 27 hastaya (%60) endoskopi, 21 hastaya da (%46,7) biyopsi yapıldığı görüldü. Kitlelerin uzun eksenini ortalama 13cm (4cm-50cm) idi. 29 hastanın (%64,4) kitlenin total olarak eksize edilmesi ile, 14 hastanın (%31,1) kitlenin barsak rezeksiyonu ile birlikte enblok rezeke edilmesi ile, 1 hastanın (%2,2) distal pankreatektomi ile, 1 hastanın da (%2,2) pankreatikoduodenektomi ile birlikte tedavi edildiği saptandı. 15 hastanın (%33,3) patoloji sonucu benign, 30 hastanın (%66,7) ise malign olarak raporlandığı görüldü. Benign kitlelerden en sık mezenter kistine (n:5, %11,1), malign kitlelerden ise gastrointestinal stromal tümörlere (GIST) (n:10, %22,2) rastlandı.

Tartışma ve Sonuç: Karın içi kitleler; farklı organlardan köken alan, farklı klinik ve histopatolojik özelliklere sahip olan kitleler olmakla birlikte tanı ve tedavi yaklaşımları açısından sistematik değerlendirilmesi gereken patolojilerdir.

Anahtar Sözcükler: *Intraabdominal Kitle, Fizik Muayene, Abdominal Ultrasonografi, Histopatolojik Tip, Gastrointestinal Stromal Tümör.*

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Intra-abdominal masses are defined as masses located at the edges of the ribs and in the region of the paraspinal muscles limited in the anterior by the iliac wings and the symphysis pubis (1). Generally, intra-abdominal masses are determined as a result of symptoms in the abdomen or in a physical examination or incidentally during radiological imaging performed for another reason. Evaluation of intra-abdominal masses is based on knowledge of the anatomy of the abdomen and which quadrant corresponds to the organs of the abdomen. In a basic anatomic approach, the abdomen is separated into 9 areas of epigastric, umbilical, suprapubic, right hypochondrium, left hypochondrium, right lumbar, left lumbar, right inguinal and left inguinal regions. However, in clinical practice, the terms more often used, especially by surgeons, are the right upper and right lower quadrant, left upper and left lower quadrant, epigastric and hypogastric regions (2).

As these masses are seen in a widely varying range, it is not correct to group them under a single diagnostic category or to apply the same diagnostic and treatment methods. Knowing that there can be several pathologies under the heading of intra-abdominal mass and what type of masses there could be in which regions of the abdomen with which symptoms and findings, and the need for systematic follow-up of which methods are used in the approach to these, demonstrates the need for evaluation of these pathologies under a heading.

There are reports in literature of diagnostic, treatment and follow-up approaches for intra-abdominal masses caused by various diseases. Although these pathologies are more often presented in the form of single case reports, there are also case series and research papers on a specific diagnosis. However, to the best of our

knowledge, there has been no previous study that has examined intra-abdominal masses in general in respect of the symptoms, findings, diagnostic approaches and treatment methods.

The aim of this study was to systematically evaluate cases operated on in our clinic because of intra-abdominal mass in respect of symptoms, findings, diagnosis and treatment in the light of the relevant information in literature.

Material and Method

Approval for the study was granted by the Local Ethics Committee. A retrospective examination was made of patients operated on because of an intra-abdominal mass in the General Surgery Clinic of Ankara Dışkapı Yıldırım Beyazıt Training and Research Hospital between May 2010 and May 2017. The data related to the patients were retrieved from hospital records, operating reports, operation photographs, the epicrisis reports recorded in the hospital automated information system, laboratory, imaging and pathological examination reports. For each patient a record was made of age, gender, symptoms, findings, the type of mass determined, diagnostic methods used, the organ or tissue of origin, whether or not preoperative biopsy was taken, dimension of the mass, benign or malignant nature of the mass, type of operation performed and pathological diagnosis. Data and analyses related to imaging examinations made during diagnosis were taken from the Radiology Clinic and data and analyses related to the histopathological diagnosis from the Pathology Clinic. Cases were excluded from the study if there were no clear findings of a mass in the physical examination or on imaging examination, if there was an endoluminal mass of the gastrointestinal system or if data were incomplete or unavailable.

Results

The study included a total of 45 patients with an intra-abdominal mass, comprising 18 (40%) males and 27 (60%) females with a mean age of 54.3 years (range, 19-86 years). The most common symptom was abdominal pain in 26 (57.8%) patients. A total of 15 (33.4%) patients presented with the complaint of being able to feel the mass in the abdomen (Table 1). In some patients, there was more than one symptom, 1 (2.2%) patient underwent emergency surgery because of intra-abdominal bleeding and in 3 (6.6%) patients, there were no symptoms. The intra-abdominal mass could be determined on palpation in 28 (62.2%) as a finding in the physical examination, and the mass could not be palpated in 17 (37.8%). USG was the most preferred imaging examination method in 36 (80%) patients, followed by abdominal CT in 28 (62.2%), abdominal MRI in 10 (22.2%) and PET-CT in 2 (4.4%) (Figure 1). More than one imaging method was used in some patients.

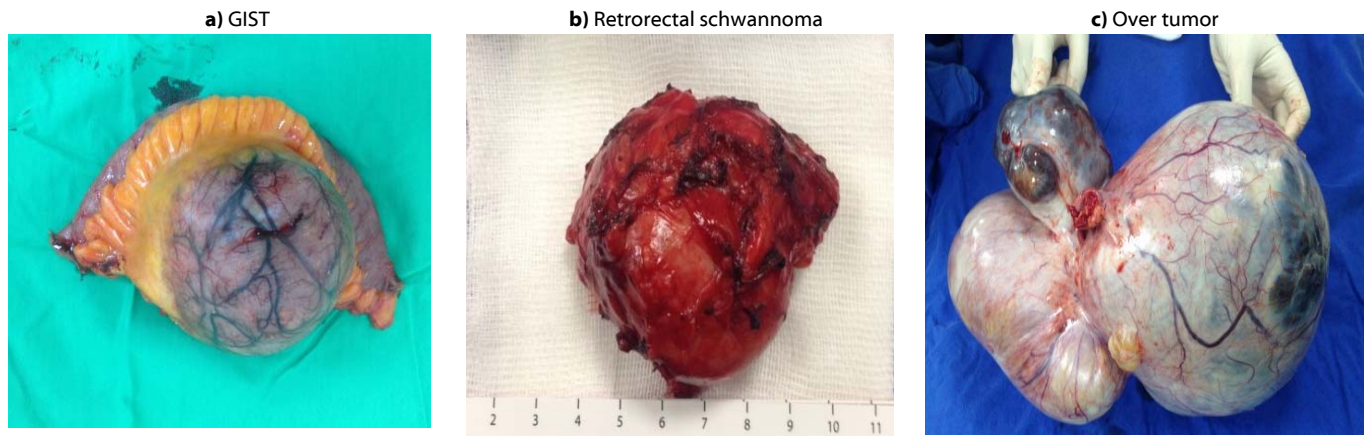
Table 1. Data on demographic and diagnostic evaluations of the patients.

	Number of patients (n)	Percentage (%)
	45	100
Gender		
Male	18	40
Female	27	60
Symptom		
Abdominal pain	26	57,8
Mass	15	33,4
Hemorrhagea	1	2,2
None	3	6,6
Physical examination		
Palpable	28	62,2
Not palpable	17	37,8
Imaging methods		
USG	36	80
BT	28	62,2
MRI	10	22,2
PET-BT	2	4,4
Endoscopy		
No	18	40
Yes	27	60
- Upper GIS	9	20
- Lower GIS	18	40
Preoperative biopsy		
No	24	53,3
Yes	21	46,7
-USG guided	17	37,8
-CT guided	4	8,8

Figure 1. a) The CT image of the jejunum-derived GIST, b) MRI image of Schwannom in the retrorectal region c) CT image of over tumor filling the abdomen



Figure 2: a) Post-operative specimen of Gastrointestinal stromal tumor (GIST), b) Post-operative specimen of Schwannom in the retrorectal region, c) Post-operative specimen of over tumor.



According to the data obtained from the operating notes, the long axis of the mass was measured as mean 13cm (range, 4-50 cm). The smallest mass with the long axis of 4 cm was seen to be related to endometriosis and the largest with the long axis of 50 cm was determined as an intra-abdominal mass related to liposarcoma. The origin of the intra-abdominal mass was seen to be the intestinal mesentery in most cases (n:18), followed by the retroperitoneum (n:10), the ovary (n:5), and the abdominal anterior wall (n:4). As treatment, total excision of the mass was applied to 29 (64.4%) patients, enbloc resection of the mass together with the bowel to 14 (31.1%), together with a distal pancreatectomy in 1 (2.2%) and together with a pancreaticoduodenectomy in 1 (2.2%)

(Figure 2). The mean length of hospital stay was 7.2 days (range, 3-16 days) and the mortality rate was determined as 4.4% (n:2) (Table 2).

Table 2. Tumor localization and type of surgery

	Number of patients (n)	Percentage (%)
Tumor localization		
Mesenter	18	40
Retroperiton	10	22,2
Over	5	11
Anterior wall of abdomen	4	8,8
Pancreas	2	4,4
Omentum	2	4,4
Stomach	1	2,2
Duodenum	1	2,2
Small intestine	1	2,2
Colon	1	2,2
Type of surgery		
Total excision	29	64,4
Enbloc resection of the mass together with the bowel	14	31,1
Distal pancreatectomy	1	2,2
Pancreaticoduodenectomy	1	2,2

When the pathology results of the patients were examined, the mass was reported as benign in 15 (33.3%) patients and as malignant in 30 (66.7%). The most frequently determined histopathological diagnosis of the benign masses was mesenteric cyst (n:5, 11.1%) and of the malignant masses, gastrointestinal stromal tumors (GIST) (n:10, 22.2%) (Table 3).

Table 3. Histopathologic types and rates of intraabdominal masses.

Benign Pathologies	n	(%)	Malign Pathologies	n	(%)
Mesenter cyst	5	11,1	GIST	10	22,2
Endometriosis	2	4,4	Liposarcoma	7	15,6
Cyst hydatic	2	4,4	Over tumor	5	11,1
Fibroma	2	4,4	Condrosarcom	2	4,4
Distrofic calcification	1	2,2	Neuroendocrin tumor	2	4,4
Aberran pancreas	1	2,2	Malign mesenchimal tumor	2	4,4
Leiomyoma	1	2,2	Lymphoma	1	2,2
Pseudocyst	1	2,2	Schwannoma	1	2,2
Total	15	33,3	Total	30	66,7

Discussion

Abdominal masses include several different pathological lesions with benign or malignant properties, solid or cystic and which can be different according to age, gender, localization and organ or tissue of origin. For a diagnosis of a pathology with so many different properties, systematic evaluation is necessary for the application of correct treatment. Knowledge of the different pathologies causing abdominal masses and the diagnostic and treatment approaches to these is of particular importance.

The process of diagnosis of an intra-abdominal mass starts with a detailed history and physical examination. These two steps form the basis of the preliminary diagnosis and differential diagnosis by which the causes of the intra-abdominal mass will be determined. The patient must be questioned in detail about symptoms, time since onset, additional gastrointestinal symptoms, known diseases, family history, previous operations and trauma history (3). In the current study, the most frequent symptom on presentation was abdominal pain followed by the complaint of feeling the mass in the abdomen. Although all of the patients in this study had an abdominal mass, only 13 presented with the complaint of the mass, showing that most of the patients were not aware of the abdominal mass. This suggests that masses that have not reached large dimensions can remain asymptomatic or in selected cases, it can manifest with the complaint of abdominal pain. In this result, the size of the mass is undoubtedly important in addition to the localization. It may be difficult for patients to notice masses, especially those with a deep retroperitoneal location or a pelvic location.

According to the study results, although the majority of the patients had complaints of a mass, in the physical

examination an abdominal mass could only be palpated in 28 patients. This result indicates the importance of the physical examination. In the determination of a mass in the abdomen in the physical examination, first it must be attempted to differentiate pathological states from causes such as postural differences which could be normal or swelling caused by obesity, gas distension, pregnancy or fecaloma. Furthermore, it is necessary to determine in the physical examination whether the mass determined requires emergency treatment, the localization, the size, the shape, the texture, the contours, whether or not it is pulsatile and whether or not it is adhering to surrounding tissues. In 1 of the cases in the current study, as a result of the findings of the physical examination of the mass determined in the abdomen, there were seen to be findings of intra-abdominal bleeding and because of hemodynamic instability, the patient was admitted for emergency surgery. This mass was determined to be of small intestine mesenteric origin, and tumor perforation had caused intra-abdominal bleeding. The pathology of the mass was reported to be GIST.

In the physical examination, when diagnosis cannot be made and localization or the origin of the mass cannot be determined or benign-malignant differentiation cannot be made, imaging examinations and biopsy procedures made according to these are extremely important in the diagnosis of intra-abdominal masses. Of the imaging examinations, it is recommended that abdominal ultrasonography (USG) is applied first as it is easily accessible, has no radiation exposure, can be applied rapidly and in a practical manner and can identify the organ of origin with solid cystic differentiation (4). In the diagnostic evaluation in the current study, abdominal USG was applied to 80% of the patients.

However, despite the above-mentioned advantages of USG, because it is dependent on the practitioner's experience and in some cases where it was insufficient for the images of intra-abdominal masses, abdominal computed tomography (CT) was applied to 28 (62.2%) patients either as the first imaging procedure or after abdominal USG (Figure 1). Abdominal CT is one of the most effective methods in current diagnostic and interventional evaluations of intra-abdominal masses (5). Unlike USG, abdominal CT clearly shows the tissue planes without any effect from gas, fat or bone structures in the abdomen and can provide the surgeon with information on the removability of the mass by showing the borders between the mass and adjacent structures (6). In patients with renal failure or a contraindication to contrast material containing iodine and in cases of masses with pancreas or retroperitoneal localization, magnetic resonance imaging is preferred (7).

To evaluate whether the intra-abdominal mass originates from hollow organs or obstruction which can occur because of the effect of the mass on the stomach and intestines, gastrointestinal (GIS) system endoscopy may be necessary. To evaluate endoluminal pathologies, lower GIS endoscopy was applied to 40% of the current cases and upper GIS endoscopy to 20%. Following imaging studies revealing the intra-abdominal mass, there may be a need for biopsy to determine the treatment approach. While biopsy under USG guidance is preferred in large, superficial and cystic lesions, biopsy under CT guidance is preferred in masses with a deep location which cannot be visualized on USG as it has high rates of accuracy (8, 9). In our study, preoperative USG and CT guided biopsy rates is similar to the literature.

In the majority of cases, the abdominal mass could be totally removed with intact surgical borders. However, in some patients, resection of the colon or small intestine was necessary to be able to remove the whole mass (Figure 2). The tumour localisation was determined as most frequently in the intestine mesentery followed by retroperitoneal location and ovarian. Of the malignant masses, the most common was determined as GIST followed by liposarcoma and the most common of the benign masses was seen to be mesenteric cysts. GIST, which can originate from any part of the gastrointestinal tract, but primarily the stomach, are rarely seen masses with the potential to be malignant (10,12).

As intra-abdominal masses more often have exophytic growth, they can manifest clinically and the surgical strategy is removal of the mass which will obtain a negative surgical border macroscopically and microscopically (13, 14). Liposarcoma are tumours which demonstrate malignant behaviour with mesenchymal origin from fat tissue. In the treatment of these masses, which can reach a large size without showing symptoms, it is again aimed to completely remove the mass with a negative surgical border (15-18). Mesenteric cysts are rarely seen, can cause symptoms of a mass with abdominal pain and can be removed laparoscopically or with open surgery depending on the symptoms and localisation (19-22). In the current study, apart from these,

several different histopathological types of mass originating from several different organs were seen (Table 3).

In conclusion, as intra-abdominal masses originate from different organs and have different clinical and histopathological properties, they are pathologies that require systematic evaluation in respect of diagnosis and treatment approaches. Although, to the best of our knowledge, this is the first study in literature on this subject, it is a fact that with an increase in the number of cases, many lesions will be able to be seen with different clinical and pathological properties. Therefore, there is a need for further multi-center studies to be able to establish diagnosis and treatment algorithms for intra-abdominal masses.

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