Aim:

Abstract:

Multidetector Computed Tomographic features of uncommon pancreatic masses.

Chhaya J Bhatt*, Kavita Vaishnav**

*Associate Professor,**Assistant Professor, Dept of Radiology and Imaging
Smt NHL Municipal Medical College,Ahmedabad

Material and Methods:-

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20 patient with uncommon pancreatic masses were studied from July 2011 to December 2012. Patients were scanned on 64 slice multidetector computed tomography (MDCT) scanner. Pre procedure preparation were done as per the protocol of our department. Plain scan after oral contrast and intravenous contrast study with, arterial (after 20secs), and venous phases (60-65secs) were obtained after injection of intravenous nonionic contrast of 80-100 ml at the rate of 4ml/sec by pressure injector. Axial, coronal and sagittal reformed images were obtained. Diagnosis was proved by fine needle aspiration cytology, biopsy or post operative histopathological findings. Clinical findings like recurrent episodes of hypoglycemia were used to diagnose functioning neuroendocrine tumours like insulinoma. Criterias like gender,age of the patient,size of the mass,characteristic features of the mass, like solid or cystic,enhancement pattern and other clinical findings like finding as a part of syndrome were considered for the diagnosis. Histopathological diagnosis was consider as the final diagnosis.

Observation and analysis:-

Gender distribution:-Male:female ratio was 1:1.2 which shows masses were more common in females. Age group included 16-75 years.

Nature of masses: - Masses were solid in nature in 40% and cystic in 60%.

Site of involvement in pancreas: - Solid masses were common in head and body region (100%) whereas cystic masses were common in body and tail region (85%).

Classification of solid and cystic masses: - as seen in table 1.

It was seen that neuroendocrinal masses were commonest solid masses whereas mucinous cystadenoma were the commonest cystic masses. Syndromic neuroendocrine masses were small masses < 2cms whereas nonsyndromic masses were 5-6cms in size. Mucinous cystadenomas were largest of all cystic masses measuring more than 10-12 cms followed by serous cystadenomas measuring 6-7cms in size. Metastatic lesions were small masses less than 2-3cms. Simple cyst associated with polycystic kidney disease (PCKD) and von Hippel Lindua (VHL) syndrome was 2-3cms seen in one patient each in our study. Mucinous cystadenocarcinoma with metastasis was seen in one patient.

Key Words:

Uncommon Pancreatic mass, Multidetector computed tomography.

Introduction:

Ductal adenocarcinoma is the commonest malignant mass and pseudocyst, commonest benign mass encountered in pancreas. However there are many uncommon solid/cystic, benign/malignant masses which has characteristic computed tomographic features differentiating them from common masses. This helps us in correct diagnosis, triage and in prognosis of the patients. We present case series of 20 patients to emphasize MDCT features of uncommon pancreatic masses.

Aim:- To detect uncommon pancreatic masses and familiarize with multidetector computed tomographic features of these masses.
Table 1: Classification of masses

<table>
<thead>
<tr>
<th>Type</th>
<th>No of patients</th>
<th>Percentage</th>
<th>Approximate size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Solid masses</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuroendocrine tumours</td>
<td>5</td>
<td>62.5%</td>
<td>&lt;2cms</td>
</tr>
<tr>
<td>Syndromic</td>
<td>3</td>
<td>37.5%</td>
<td>&lt;2cms</td>
</tr>
<tr>
<td>Non-syndromic</td>
<td>2</td>
<td>25%</td>
<td>4-6cms</td>
</tr>
<tr>
<td>Metastasis</td>
<td>2</td>
<td>25%</td>
<td>2-3cms</td>
</tr>
<tr>
<td>Chronic inflammatory mass</td>
<td>1</td>
<td>12.5%</td>
<td>1-2cm</td>
</tr>
<tr>
<td><strong>Cystic masses</strong></td>
<td>12</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td>Mucinous cystadenoma</td>
<td>4</td>
<td>37.3%</td>
<td>&gt;10-12cms</td>
</tr>
<tr>
<td>Serous cystadenoma</td>
<td>3</td>
<td>25%</td>
<td>5-7cms</td>
</tr>
<tr>
<td>Simple cyst</td>
<td>2</td>
<td>16.6%</td>
<td>1-2cm</td>
</tr>
<tr>
<td>Pancreatic tuberculoma</td>
<td>1</td>
<td>8.3%</td>
<td>4-5cms</td>
</tr>
<tr>
<td>Intraductal papillary tumour</td>
<td>1</td>
<td>8.3%</td>
<td>4-5cms</td>
</tr>
<tr>
<td>Mucinous cystadenocarcinoma</td>
<td>1</td>
<td>8.3%</td>
<td>&gt;10cms</td>
</tr>
</tbody>
</table>

Table 2: Difference between serous and mucinous cystadenoma

<table>
<thead>
<tr>
<th></th>
<th>Serous Cystadenoma</th>
<th>Mucinous cystadenoma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of patient</td>
<td>&gt;60yrs</td>
<td>40-70yrs</td>
</tr>
<tr>
<td>Location</td>
<td>Mostly in head and body</td>
<td>Mostly in body and tail</td>
</tr>
<tr>
<td>Surface</td>
<td>Lobulated</td>
<td>Smooth external surface</td>
</tr>
<tr>
<td>Demarcation</td>
<td>Poorly demarcated due to lack of capsule</td>
<td>Well demarcated with thick wall</td>
</tr>
<tr>
<td>Size of cysts</td>
<td>Many internal cysts,&lt;2cms</td>
<td>6or few internal cysts &gt;2cms</td>
</tr>
<tr>
<td>Density on CT</td>
<td>Water to muscle density</td>
<td>Water density</td>
</tr>
<tr>
<td>Calcification</td>
<td>Central</td>
<td>Peripheral</td>
</tr>
<tr>
<td>Enhancement Pattern on CT</td>
<td>May enhance due to rich capillary network</td>
<td>Peripheral rim enhancement with enhancing septation</td>
</tr>
</tbody>
</table>

Gender wise distribution of masses: - In females, 64% of masses were cystic whereas 36% were solid. In males 55.5 % of masses was cystic and 44.4% solid, which shows that cystic masses were common in both genders.

Enhancement pattern of masses: - Neuroendocrine masses were intensely enhancing on arterial phase followed by metastasis. Large masses showed central areas of necrosis. These masses became isodense on portal venous phase. Cystic masses like cystadenomas showed only peripheral and septal enhancement on portal venous phase. Simple cyst and tuberculoma showed no enhancement.

Calcification: - Central calcification was seen in serous cystadenoma in two patients and peripheral in mucinous cystadenoma in one patient and one patient with inflammatory mass had calcification. No other masses showed calcification.

Discussion:- There are many uncommon pancreatic masses with distinct MDCT feature which helps in diagnosis of these masses. This helps in triage and prognosis of the patients as lesion like serous cystadenoma are like “No touch“ lesions and does not require resection whereas masses like mucinous cystadenoma or intrapapillary mucinous tumour are considered premalignant and should be resected.
Masses can be either solid or cystic in nature with either being benign or malignant. Solid masses are pancreatic neuroendocrine tumour (PNET), metastasis and rarely inflammatory masses. PNETs are referred to as islet cell tumours; but that term is no longer acceptable as evidence suggests that they do not arise from the islets of Langerhans, but rather from ductal pleuripotent stem cells, accounts for 1%–2% of pancreatic neoplasm, seen in 4th–6th decades of life with no gender preponderance commonly seen in head region. They are classified as syndromic/non-syndromic or functional/non-functional depending on their clinical presentation. Insulinoma, gastrinoma and glucagonoma are common pancreatic neuroendocrine tumours, insulinoma being most common. They may manifest as sporadic tumours or as part of certain syndromes, including multiple endocrine tumours type1 (MEN 1), von Hippel Lindau syndrome or neurofibromatosis. Syndromic neuroendocrine masses are small lesion with 1-2cms termed as microdenomas with characteristic intense arterial enhancement due to rich capillary network which is more than surrounding pancreatic parenchyma and becomes isodense in portoveneous and delayed phases. (Figure 1a)

Figure 1a: Syndromic neuroendocrine mass seen in 60yr old patient, axial image showing homogeneously hyperattenuating mass in arterial phase in uncinate process of pancreas.

Figure 1b: Nonsyndromic pancreatic neuroendocrine tumour in 58yrs old female with pain in upper abdomen, coronal image showing intensely enhancing mass in arterial phase with necrotic non enhancing component and enlarged pancreaticoduodenal artery. These features are 100% sensitive in diagnosing the lesions. Enhancement is homogeneous in small lesions whereas large masses are usually non syndromic and shows ring like or heterogeneous enhancement due to cystic or necrotic areas. (Figure 1b) PNET may also occasionally be cystic which than shows thick intense ring enhancement which can differentiate it from other cystic masses. Intensely enhancing lesion can be mistaken for metastasis but clinical presentation may play an important role in differentiating them. Isoattenuating masses may be difficult to visualize, where subtle pancreatic duct indention or changes in pancreatic duct calibre may be a helpful clue. Calcification though not the feature of endocrine tumours can be seen in 20% best delineated on CT. Atypically it may obstruct the pancreatic duct but the severity is less as compared to adenocarcinoma.

Cystic masses: represents 10%-15% of pancreatic masses. Cystic masses are often misdiagnosed for pseudocyst as seen in study by Warshaw where 22 out of 67 patients were misdiagnosed, emphasizing the need to correlate patient’s clinical scenario and laboratory data. Differential diagnosis of cystic masses are: Cyst associated with syndromes like VHL and PCKD, serous cystadenoma, mucinous cystadenoma, intraductal papillary mucinous tumour (IPMT), solid and papillary epithelial neoplasm (SPEN), cystic endocrine mass, cystic metastasis, mucinous cystadenocarcinoma (MCAC) and rarely lymphangioma, haemangioma, hydatid cyst. Congenital pancreatic cysts are seen in association with syndromes like PCKD and VHL. A study based on 213 patients showed that prevalence of pancreatic cyst was 5% with autosomal dominant polycystic disease whereas 50%-90% in patients with VHL. Cyst varies in size from microscopic to several centimetres. (Figure 2a)

Figure 2a: Simple cyst in 60yrs old female was an incidental finding

Serous cystadenoma is also referred as microcystic adenoma while mucinous as macro cystic adenoma. Difference between serous cystadenoma and mucinous cystadenoma is shown in table 2. It is important to differentiate these two, as serous cystadenoma is benign mass whereas mucinous cystadenoma is considered premalignant as 80% of these cysts have epithelial cells that are atypical or frankly malignant. Cystic lesion with 6 or fewer internal cyst >2cms with peripheral calcification seen in 10-25% is highly suggestive of mucinous cystadenoma. (Figure 2b)
Mucinous cystadenoma (MC) of pancreas is malignant cystic mass. Malignant conversion of mucinous cystadenoma is often difficult to determine. Median age of diagnosis is greater than cystadenoma. Site of involvement is usually head and body of pancreas. CA19 levels are elevated in 75% of patients. Usually these are large lesions with enhancing septation and solid components. Dilatation of pancreatic duct may be seen in 87% of patients. Calcified metastasis is seen in MCAC.

Pancreatic metastasis: Metastatic disease of pancreas is uncommon accounting for 2% of pancreatic masses and seen in 3-12% at autopsy in cases of advanced malignancies. Primary that metastasizes to pancreas is lung, breast renal cell carcinoma, from GIT, malignant melanoma, thyroid and occasionally from osteosarcomas and chordrosarcoma. There is no predilection for any part of pancreas. They appear either as single nodular lesion seen in 50-75% of cases; diffuse involvement reported in 15-45% of cases or multiple lesions in 5-10%. Small masses enhance homogeneously with hyper attenuating enhancement in arterial phase, or ring enhancement as seen in our case.

Intraductal papillary mucinous tumour is considered to be part of mucinous cystadenoma arising from ductal epithelium. Arising from main duct it is termed as ductal type; from ductal branches termed as branch type and combined. In main duct type there is gross dilatation of main pancreatic duct filled with mucin and papillary excrescences seen as filling defect. In branch type, lesion is usually located in uncinate process of pancreas with multiple clustered of small cyst with lobulated margins and septa and dilated ducts in the region. Bulging of papilla in the duodenal lumen seen on ERCP is diagnostic.
Figure 3c: Same patient with lung malignancy also has bilateral adrenal metastasis.

Whereas large lesion shows areas of necrosis. Usually their appearance resembles that of primary neoplastic site. Points that help differentiating it from adenocarcinoma of pancreas are: a) Multiplicity of lesions b) Enhancement pattern c) If it obstructs the duct it is less severe than adenocarcinoma or large tumour without dilated ducts d) Know primary neoplastic disease e) Coexisting metastasis at sites where adenocarcinoma does not metastasize like skeleton or adrenal glands as seen in our patient (Figure 3b, 3c) and f) Non obliterated retro pancreatic fat planes.

Pancreatic Tuberculosis: Pancreatic tuberculosis is extremely uncommon and usually seen in scenario of military tuberculosis or immunodeficiency state. Though rare this lesion should always be included in differential diagnosis of any space occupying lesion of pancreas in our country especially when there are associated symptom and adjacent lymphadenopathy as in one of our patient (Figure 4a, 4b).

Figure 4a Post contrast axial image shows non enhancing cystic mass in tail of pancreas in 16yrs old female with history of abdominal pain and raised erythrocyte sedimentation rate, proved to be tuberculous granuloma.

Figure 4b Same patient with associated mesenteric lymphadenopathy.

The lesion appears as hypo dense mass on CT with no significant enhancement or peripheral enhancement or multiloculated appearance, may be associated with necrotic lymphadenopathy and no surrounding invasion.

Inflammatory masses: Let’s not forget inflammatory mass that can be seen in patients with chronic pancreatitis as they would not always be adenocarcinoma though it is common, as seen in our patient (Figure 5). These masses may be difficult to diagnose radiologically and often requires histopathological confirmation.

Figure 5: Pancreatic inflammatory mass proved on fine needle aspiration cytology in 37yrs old patient with chronic pancreatitis.

Conclusion: - Multidetector computed tomography plays an important role in diagnosing the uncommon pancreatic masses as all solid masses are not adenocarcinoma and all cystic masses are not pseudocyst.

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References: