In the pancreas, a variety of conditions may form solid masses that may mimic cancer. Lesions of the pancreas are classified in 2 categories: nonneoplastic and neoplastic lesions.\(^1\) Nonneoplastic lesions include congenital anomalies (annular pancreas, heterotopic pancreas), pancreatitis, abscess and granulomatous inflammation, pseudocysts, and cysts.\(^2\) Neoplastic lesions consist of ductal adenocarcinoma, anaplastic carcinoma, cystic pancreatic lesions, intraductal papillary mucinous neoplasms and pancreatic intraepithelial neoplasia, acinar cell tumors, solid-pseudopapillary tumor, pancreatoblastoma, other epithelial exocrine tumors, lymphoid tumors, mesenchymal tumors, and metastatic tumors.\(^1\) This study is a clinical and histopathological evaluation of nonneoplastic lesions reported in pancreatectomy patients from a period of 12 years.
Methods

The clinical findings and histopathological diagnoses of 112 pancreaticectomies performed between January 2004 and June 2016 in a single clinic were retrospectively evaluated for nonneoplastic lesions of the pancreas. The data analyzed, including the initial diagnosis, procedure performed, and final histopathological results, are provided in Table 1.

Results

Nonneoplastic lesions of the pancreas were observed in 20 (16%) of 122 pancreaticectomy cases. Clinicians were initially concerned about the possibility of a malignancy due to the appearance of a mass lesion. Since invasive interventions are difficult and limited cytopathological evaluation is available, due to inherent characteristics of this region, in addition to the high risk of malignancy, surgery was planned. Histopathological examination revealed the presence of chronic pancreatitis (n=11), hematoma (n=1), hemorrhagic necrosis secondary to trauma (n=1), pseudocyst (n=1), granulation tissue (n=1), retention cyst (n=1), choleductal cyst (n=1), Castleman disease (n=1), and fat necrosis (n=1). No pathology was seen in the final case. Among the cases with chronic pancreatitis, 1 was diagnosed with autoimmune pancreatitis because of increased serum immunoglobulin G levels, histopathologically diffuse lymphoplasmocytic cell infiltration, and fibrosis. Adenomyoma of the ampulla of Vater was observed in another, and a pseudocyst was found in a third.

Discussion

The term chronic pancreatitis describes various progressive fibroinflammatory diseases that cause glandular damage in the exocrine pancreas.\cite{1} Although the incidence of chronic pancreatitis is not precisely known, Yadav et al.\cite{2} determined an incidence and a prevalence of chronic pancreatitis of 4.05/100,000 and 41.76/100,000, respectively. Domínguez-Muñoz et al.\cite{3} reported an incidence of chronic pancreatitis of 4.66/100,000. Chronic pancreatitis is more frequently detected in men.\cite{2, 4} In our study, there were 6 male and 5 female patients with chronic pancreatitis.

Alcohol intake is the most important risk factor in chronic pancreatitis.\cite{1-3, 5} Frulloni et al.\cite{5} found alcohol as an etiological factor in 43% of 893 cases of chronic pancreatitis. Other important risk factors include genetic factors, ductal obstruction, and smoking.\cite{1, 4, 6, 7}

Clinically, the most prevalent and characteristic surgical indication for chronic pancreatitis is abdominal pain, which sometimes becomes very severe.\cite{8, 9} Fully developed pancreatitis can lead to failure of both the exocrine and endocrine functions of pancreas.\cite{9}

Chronic pancreatitis is characterized by a grossly enlarged

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Gender</th>
<th>Initial diagnosis</th>
<th>Procedure performed</th>
<th>Pathological diagnosis</th>
<th>Right/ex</th>
<th>Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>M</td>
<td>Firearm injury</td>
<td>Wedge resection</td>
<td>Hematoma</td>
<td>Right</td>
<td>11 years</td>
</tr>
<tr>
<td>55</td>
<td>M</td>
<td>Insulinoma</td>
<td>Pancreatectomy</td>
<td>Normal</td>
<td>Right</td>
<td>11 years</td>
</tr>
<tr>
<td>37</td>
<td>M</td>
<td>Penetrating stab wound</td>
<td>Subtotal pancreatectomy</td>
<td>Necrosis congestion</td>
<td>Right</td>
<td>11 years</td>
</tr>
<tr>
<td>50</td>
<td>F</td>
<td>Carcinoma</td>
<td>Pancreatecto-duodenectomy</td>
<td>Chronic pancreatitis</td>
<td>Right</td>
<td>10 years</td>
</tr>
<tr>
<td>49</td>
<td>M</td>
<td>Pseudocyst</td>
<td>Pancreatectomy</td>
<td>Pseudocyst</td>
<td>Right</td>
<td>10 years</td>
</tr>
<tr>
<td>61</td>
<td>M</td>
<td>Carcinoma in fistula tract</td>
<td>Fistula tract excision</td>
<td>Granulation tissue</td>
<td>Right</td>
<td>12 years</td>
</tr>
<tr>
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<td>F</td>
<td>Carcinoma</td>
<td>Biopsy</td>
<td>Chronic pancreatitis</td>
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<td>12 years</td>
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<tr>
<td>47</td>
<td>F</td>
<td>Cystadenoma</td>
<td>Excision</td>
<td>Retention cyst</td>
<td>Right</td>
<td>7 years</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>Cystadenoma</td>
<td>Whipple procedure</td>
<td>Choledoctal cyst</td>
<td>Right</td>
<td>1 year</td>
</tr>
<tr>
<td>53</td>
<td>M</td>
<td>Carcinoma</td>
<td>Whipple procedure</td>
<td>Chronic pancreatitis</td>
<td>Right</td>
<td>1 year</td>
</tr>
<tr>
<td>54</td>
<td>F</td>
<td>Lymphoma</td>
<td>Excision</td>
<td>Castleman disease</td>
<td>Right</td>
<td>1 year</td>
</tr>
<tr>
<td>50</td>
<td>M</td>
<td>Carcinoma</td>
<td>Subtotal pancreatectomy</td>
<td>Chronic pancreatitis</td>
<td>Right</td>
<td>1 year</td>
</tr>
<tr>
<td>45</td>
<td>M</td>
<td>Carcinoma</td>
<td>Whipple procedure</td>
<td>Chronic pancreatitis</td>
<td>Right</td>
<td>4 months</td>
</tr>
<tr>
<td>56</td>
<td>F</td>
<td>Periampullary region tumor</td>
<td>Whipple procedure</td>
<td>Chronic pancreatitis</td>
<td>Right</td>
<td>4 months</td>
</tr>
<tr>
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<td>M</td>
<td>Carcinoma</td>
<td>Excision</td>
<td>Chronic pancreatitis</td>
<td>Right</td>
<td>3 months</td>
</tr>
<tr>
<td>39</td>
<td>F</td>
<td>Cushing disease</td>
<td>Bilateral adrenalectomy and distal pancreatectomy</td>
<td>Fat necrosis</td>
<td>Right</td>
<td>2 years</td>
</tr>
<tr>
<td>50</td>
<td>F</td>
<td>Cyst</td>
<td>Subtotal pancreatectomy</td>
<td>Chronic pancreatitis</td>
<td>Right</td>
<td>2 years</td>
</tr>
<tr>
<td>67</td>
<td>M</td>
<td>Carcinoma</td>
<td>Whipple procedure</td>
<td>Adenomyoma</td>
<td>Right</td>
<td>2 years</td>
</tr>
<tr>
<td>56</td>
<td>M</td>
<td>Carcinoma</td>
<td>Whipple procedure</td>
<td>Chronic pancreatitis</td>
<td>Right</td>
<td>2 years</td>
</tr>
<tr>
<td>54</td>
<td>F</td>
<td>Papilloma</td>
<td>Whipple procedure</td>
<td>Chronic pancreatitis</td>
<td>Right</td>
<td>2 years</td>
</tr>
</tbody>
</table>
or atrophic, nodular, hard, and misshapen pancreas. In some cases, ductal obstruction by a stone or a tumor may be seen. In our study, there was an instance of an obstructive, ampullary-region adenomyoma that led to chronic pancreatitis (Fig. 1). Ampullary-region adenomyoma, which generally causes a biliary system obstruction, is a benign nodular lesion with a proliferation of both epithelial (gland and ductus) and smooth muscle components.[10, 11]

In chronic pancreatitis, microscopically, the main characteristics are ductal and acinar dilation, squamous metaplasia, intraluminal eosinophilic mucoprotein plugs, acinar atrophy, and sclerosis (Figs. 2, 3). Mononuclear inflammatory cell infiltration accompanied by mast cells around the lobules and ducts is seen (Fig. 4).[12] Islets of Langerhans may be sclerotic, lost, or may proliferate in an invasive cell pattern in the peripancreatic adipose tissue.

Manifestations of pancreatitis detected in 1 patient in this study, a 45-year-old male, were characterized by diffuse lymphoplasmacytic infiltrate and fibrosis (Fig. 5).

Treatment modalities for chronic pancreatitis include drainage of the pancreatic duct, partial pancreatic resection, and near total pancreatectomy.[13-18] In our study, of 11 cases with pancreatitis, 6 underwent a Whipple procedure, 2 a pancreaticoduodenectomy, 1 a subtotal pancreatectomy, 1 an excision, and a biopsy was performed in 1 case.

Cystic lesions of the pancreas may be classified in 3 groups: true cysts, pseudocysts, and cystic neoplasias.[19, 20] Pseudocysts are the most frequently seen cystic lesions of the pancreas. In our study, pseudocysts were detected in a 49-year-old male and a 50-year-old male patient with chronic pancreatitis. Pseudocysts are nonepithelial cystic lesions associated with acute or chronic pancreatitis, trauma, and

Figure 1. Ampullar adenomyoma (H&Ex100).

Figure 2. Chronic pancreatitis (H&Ex100).

Figure 3. Chronic pancreatitis (H&Ex100).

Figure 4. Chronic pancreatitis (H&Ex200).
rarely, neoplastic obstruction of large ducts.\textsuperscript{[21, 22]} They are more frequently seen in men, with a variable mean age.\textsuperscript{[22]} Microscopically, the wall of the pseudocyst consists of non-epithelialized granulation or fibrotic tissue (Fig. 6). It usually contains tissue rich in intraluminal amylase and hemorrhagic debris.\textsuperscript{[24]} In our study, a 47-year-old female patient who underwent excision of a cyst with an initial diagnosis of serous cystadenoma had definitive diagnosis of a retention cyst based on histomorphological findings. Retention cysts are true cysts lined with pancreatic duct epithelium that create cystic dilations of the pancreatic duct due to intraluminal obstruction.\textsuperscript{[24]}

A 5-year-old male patient underwent a Whipple procedure with the initial clinical diagnosis of serous cystadenoma, but received a histomorphological diagnosis of choleductal cyst. Choleductal cysts are a rarely seen congenital anomaly that involves dilation of the intra- and/or extrahepatic bile duct.\textsuperscript{[25]} Microscopically, discrete areas of destruction and inflammation are seen. Forny \textsuperscript{et al.}\textsuperscript{[25]} reported the notable finding of choleductal cyst fibrosis in 45.5\% of the liver biopsies in a retrospective analysis of 30 pediatric cases. Analysis of a series of excision material sections from a 54-year-old female patient who presented with an initial clinical diagnosis of lymphoma did not reveal findings specific to the pancreas; however, Castleman disease involving the peripancreatic lymph node was noted. Castleman disease is a rarely seen lymphoproliferative disease characterized by an enlarged hyperplastic lymph node.\textsuperscript{[26]} It is most frequently seen in the mediastinum, followed by the cervical region, and rarely, in the pelvic cavity, axilla, or retroperitoneum.\textsuperscript{[26]} In our study, it was observed in the unusual location of the retroperitoneal peripancreatic lymph node (Fig. 7).

In the present study, a hematoma was detected in a 45-year-old male patient who underwent a wedge resection following a firearm injury, and necrosis and congestion were observed in a 37-year-old male patient who underwent a subtotal pancreatectomy due to a penetrating stab wound. Histomorphological analysis of the excision material retrieved from a pancreatic fistula tract of a 61-year-old male patient with suspected malignancy revealed granulation tissue. Fat necrosis of a pancreas specimen was seen in a 39-year-old female patient who underwent a bilateral adrenalectomy and distal pancreatectomy with the indication of Cushing disease. No pathology was detected in the pancreatic tissue material of a 55-year-old male patient who underwent a pancreatectomy with the initial clinical diagnosis of insulinoma.

This study was a retrospective analysis of nonneoplastic lesions of the pancreas from the clinical and histopathological perspectives.
Disclosures

Ethics Committee Approval: The study was approved by the Local Ethics Committee.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.


References