

ORIGINAL ARTICLE

Lymphoepithelial Cyst of Pancreas - Case Report and Analysis of 235 Cases Reported In Literature

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ABSTRACT

Background Lympho Epithelial Cysts are rare benign lesions, mostly seen involving the tail of pancreas in middle aged men. But precious little is known of these cysts as most are described in case reports only. So a comprehensive analysis of these case reports is needed to glean useful information and form an algorithm for effective treatment. **Methodology** An analysis done of all available case reports in literature reveals most are symptomatic though asymptomatic cases are increasingly detected on routine imaging. Usually solitary, they are mostly multilocular with a mean size of 4.7 cm. The most common markers include fluid carcinoembryonic antigen and serum CA 19-9. Both can be markedly elevated in lympho epithelial cysts. Conservative wait and watch management can be followed if the patient is asymptomatic and diagnosis is certain. However, only 11.5% underwent such a management revealing an inability to rule out malignancy beyond reasonable doubt or symptomatology of these lesions in most instances. Pancreas preserving enucleation and pancreatic resection procedures are most commonly performed in lympho epithelial cysts depending on the accuracy of diagnosis with an enucleation of the cyst being preferred for those with a definite diagnosis of lympho epithelial cysts. **Conclusion** Lympho epithelial cysts which are asymptomatic with an accurate preoperative diagnosis can be followed by surveillance. Pre operatively diagnosed symptomatic lesions can be managed by pancreatic parenchyma preserving over radical pancreatic procedures. For patients with doubtful diagnosis, radical pancreatic resection may be necessary. Tumor markers like serum CA 19-9 and fluid carcinoembryonic antigen are most commonly elevated in lympho epithelial cysts further confounding the diagnosis in equivocal cases. Further diagnostic clarity is needed in this subgroup of patients to clearly characterize these lesions. But till then, a low threshold for surgery is required in these patients for effective management.

INTRODUCTION

Lympho Epithelial Cysts of the pancreas are benign, slow growing lesions in the pancreas. Due to their rarity, they have been described most often in individualised case reports in medical literature. The aim of this article is to analyse these rare cysts in detail so as to form meaningful conclusions for further treatment and management.

OUR CASE

A thirty-three-year-old female patient presented with history of vague abdominal pain and backache for 6 months duration. The pain was confined to the epigastric region with no radiation of pain. There were no other symptoms. Patient had previous history of emergency splenectomy done 20 years back for trauma. Other medical records pertaining were unavailable. CECT abdomen (**Figures 1, 2**) done revealed a homogenous cystic lesion at the tail of the pancreas. Ultrasound guided aspiration of the cyst revealed a paucicellular, straw coloured infiltrate, negative for malignant cells. Fluid CEA-2ng/mL (N<2.5 ng/mL), F.

CA19-9 was 148 IU/mL (N<37 IU/mL). Serum CA19-9 and S.CEA were normal. In view of persistent abdominal pain and increased fluid CA19-9, it was decided to proceed with surgery. Intraoperatively, 5 cm smooth walled cystic lesion was seen in the tail of pancreas. As the lesion was adherent to the tail of the pancreas without a clear plane of separation from the pancreas and as malignancy could not be conclusively ruled out, it was decided to proceed with distal pancreatectomy (**Figure 3**). Cut section of the cyst revealed a thick greasy material with smooth wall. Histopathology of cyst revealed stratified squamous epithelium with overlying layer of lymphoid tissue. This was consistent with a diagnosis of lymphoepithelial cyst of pancreas. Post operative course was uneventful.

METHODOLOGY

All cases of lymphoepithelial cysts described in literature were analysed after a thorough search of medical literature and databases like PUBMED. Though most cases described are case reports, there are a few recent case series of the same also. All reports were divided into three periods based on two landmark publications by Adsay *et al.* [1] in 2002 and by sekwni *et al.* [2] in 2010.

Our aim was to analyse the incidence, geographical location, patient variables like age, sex, symptoms, location of cyst in pancreas including type, treatment offered and follow up of Lymphoepithelial cysts (LEC) of pancreas based on the three periods to observe for changes in management over time.

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Keywords Carcinoembryonic Antigen; Cysts; Pancreas
Abbreviations CEA carcinoembryonic antigen; CECT contrast-enhanced computed tomography; EUS Endoscopic Ultrasound; LEC lympho epithelial cysts
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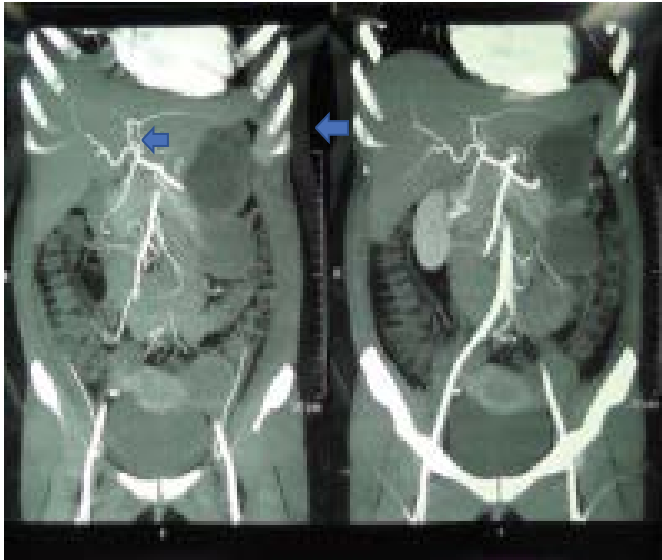


Figure 1. Cect showing 5 × 5 cm homogenous cystic lesion (arrow) adherent to the tail of pancreas Note the post splenectomy status.



Figure 2. Cect showing eccentric unilocular cyst (arrow) at the tail of pancreas.

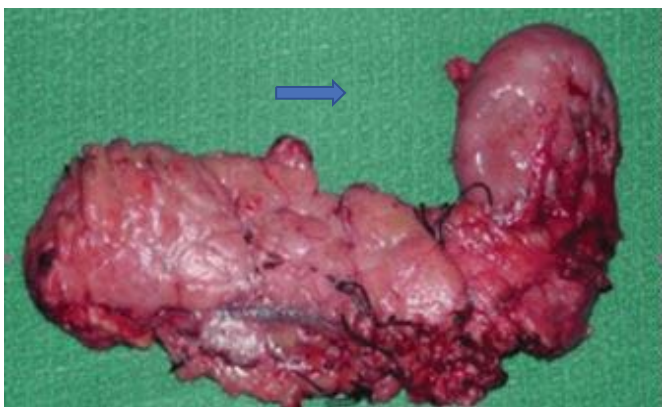


Figure 3. Intraoperative showing distal pancreatectomy specimen with cyst (arrow) attached to tail of pancreas.

Based on our study, we analysed a total of 235 cases (including our case) which were divided into **(Figure 4)**

Till 2002 (till Adsay *et al.*) - 82 cases

2003-2010 (till Sekwani *et al.*) - 69 cases

2011- till date (after Sekwani *et al.* -till date) - 84 cases(including our case)

Over time, it is seen that there is an increasing trend towards increased non operative “wait and watch” which is made possible due to increased accuracy in diagnosis of LEC. Further information on the methodology and cases considered is in Supplementary File.

Inclusion Criteria

All cases of lymphoepithelial cysts in the pancreas and peripancreatic area were included in the study. The diagnosis of LEC in operated cases rested on histopathology which showed a cystic lesion lined by stratified squamous epithelium surrounded by lymphoid tissue in the absence of skin appendages like hair. Though some cases were described previously in literature as “epidermoid cyst derived from an accessory spleen in the pancreas” or “accessory splenic epidermoid cyst”, the pathologic description and illustrations for these cases were suggestive of a lymphoepithelial cyst [3, 4, 5, 6, 7, 8, 9, 10, 11].

Exclusion Criteria

Other cystic lesions of pancreas including malignancy, benign lesions like dermoid cyst and some early cases reported with incomplete information were excluded.

RESULTS

The following inference could be made on the data analysed.

Incidence

LEC are probably worldwide in distribution with most cases (70.2%) being reported from the United States (n=113, 48.8%) and Japan (n=52, 22.1%) **(Table 1)**. The term “lymphoepithelial cyst” was coined by Troung in 1987 [12]. However, cases suggestive of lymphoepithelial cysts have been described in literature since 1980. The data has been increasing annually over time with most cases reported so far in 2006(31 cases) **(Figure 5)**. The vast majority (N=108) (45.9%) of reported cases are single case reports with some large case series being reported recently. The largest case series reported so far is by Dalal *et al.* (16 cases) [13], followed by Adsay *et al.* [1] (12 cases) with Nasr *et al.* [14] and Raval *et al.* (9 cases each) [15].

Patient Variables

LEC are most commonly seen in the middle aged with a male preponderance of 4:1 (n=189, 80.4%). Overall, LEC are frequently symptomatic (50.2%) **(Table 2)**. The number of asymptomatic cases (40.85%) is rising steadily in world literature due to better accuracy in radiological investigations **(Table 3)**. Among those symptomatic, the most common symptom was abdominal pain (77.9%) in 92 patients followed by weight loss **(Figure 6)**. LEC are usually solitary (n=228) and eccentrically situated within the pancreas (99.1%) **(Table 4)**. The most common pancreatic site is distal to the pancreatic neck where it is most common in the tail (n=98, 41.7%) followed by

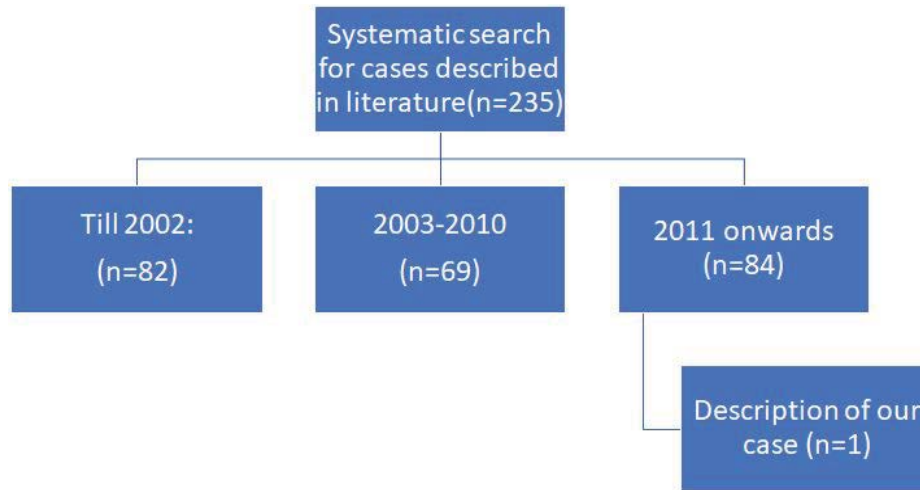


Figure 4. Scheme of study.

Table 1. Geographical incidence of cases described so far.

Country from which reported	Till 2002 (Adsay <i>et al.</i>) (n=82)	From 2003-2010 (sekwani <i>et al.</i>) (n=69)	From 2011-2018 (n=84)	Combined
United states	39	37	37	113
Japan	27	12	13	52
South Korea(SK)	4	2	9	15
United kingdom(UK)	-	3	12	15
Europe(except UK)	11	9	8	28
Asia (except Japan/SK)	-	3	2	5
Africa(Nigeria-2,Tunisia-1)	-	1	2	3
North America(Canada)	-	1	-	1
South America(Argentina)	-	1	-	1
Australia	1	-	1	2

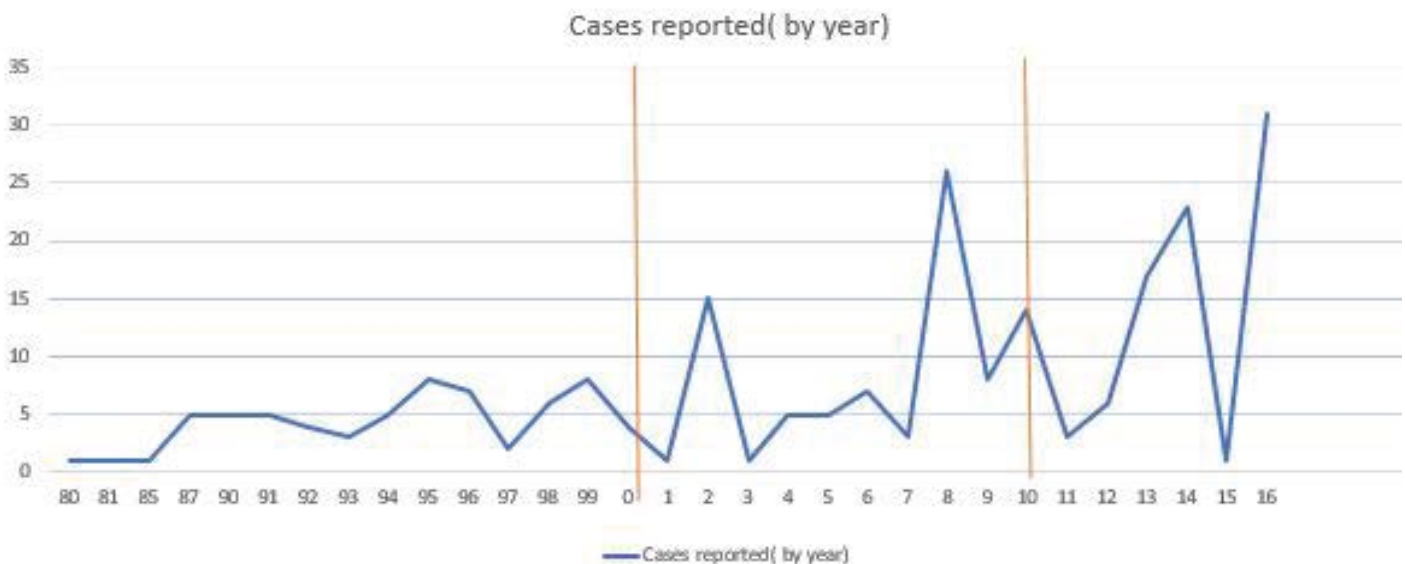


Figure 5. LEC cases described by year.

Table 2. Variables of LEC patients.

Parameters	Till 2002 (Adsay <i>et al.</i>) (n=82)	From 2003-2010 (sekwani <i>et al.</i>) (n=69)	From 2011-2018 (n= 81/84)*	Combined
Age (mean)	55.6	54.2	56.03	55.38
Sex(M:F)	67:15	54:15	68:16	189:46

* data not available in 3 cases

the body (66, 28.1%) and head (n=64, 27.2%) (Figure 7). Mean size of the cysts is 4.7 cm. Symptomatic cysts had larger diameter compared to asymptomatic cysts (5.2 vs. 4.8 cm) and patients treated by intervention had significantly larger

size to those cysts treated by conservative non operative management (4.9 vs. 4 cm) (Table 5). Most common morphological pattern seen is multilocular (48.9%) followed by unilocular cysts (43.8%) (Figure 8).

Table 3. Symptomatology of LEC.

Symptomatology	Till 2002 (Adsay <i>et al.</i>) (n=82)	From 2003-2010 (till sekwani <i>et al.</i>) (n=69)	From 2011-2018 (n=84)	Combined (n=235)
symptomatic	44(53.6%)	39(56.5%)	35(41.6%)	118(50.2%)
Asymptomatic	25	30	41	96(40.85%)
N/A	9	-	8	17(7.2%)
Autopsy**	4	-	-	4(1.7%)

** lesions discovered at autopsy

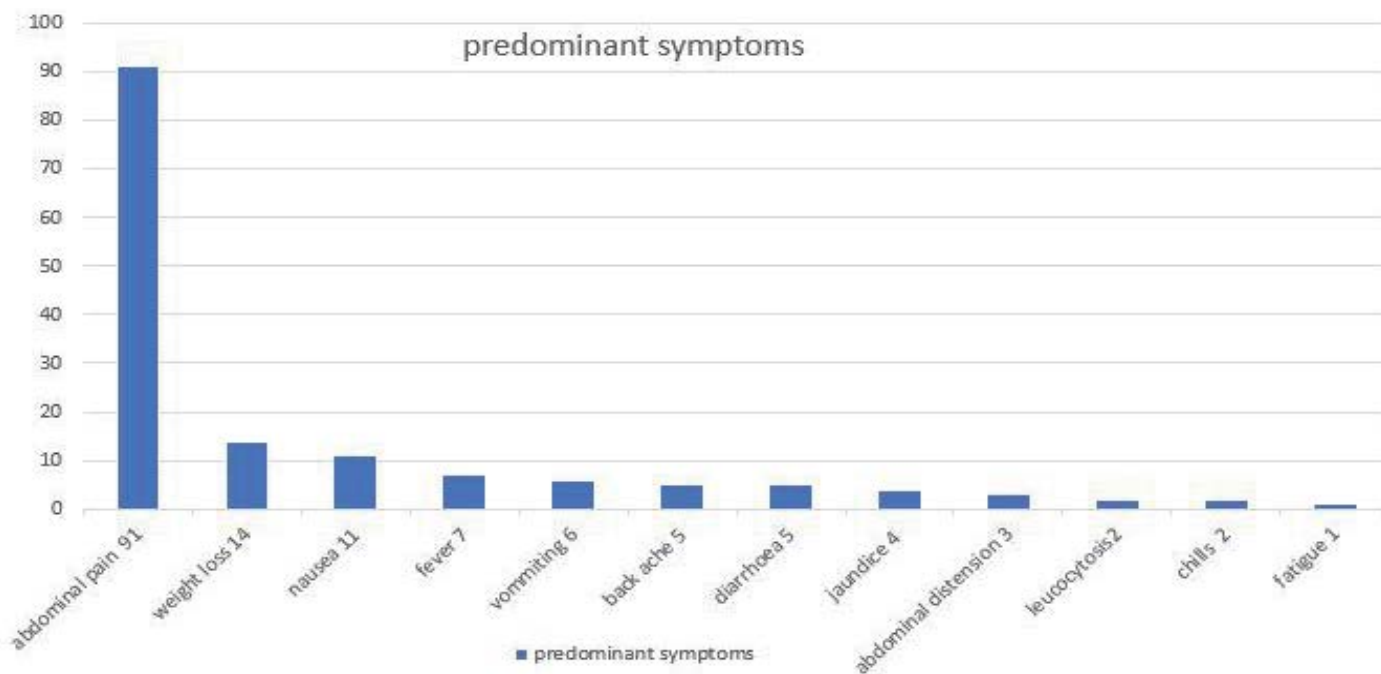


Figure 6. Symptomatology of LEC.

Table 4. Location, centricity of LEC.

Location	Pancreas (232)	Peripancreatic (3)
number	228(solitary), 4(multiple)	

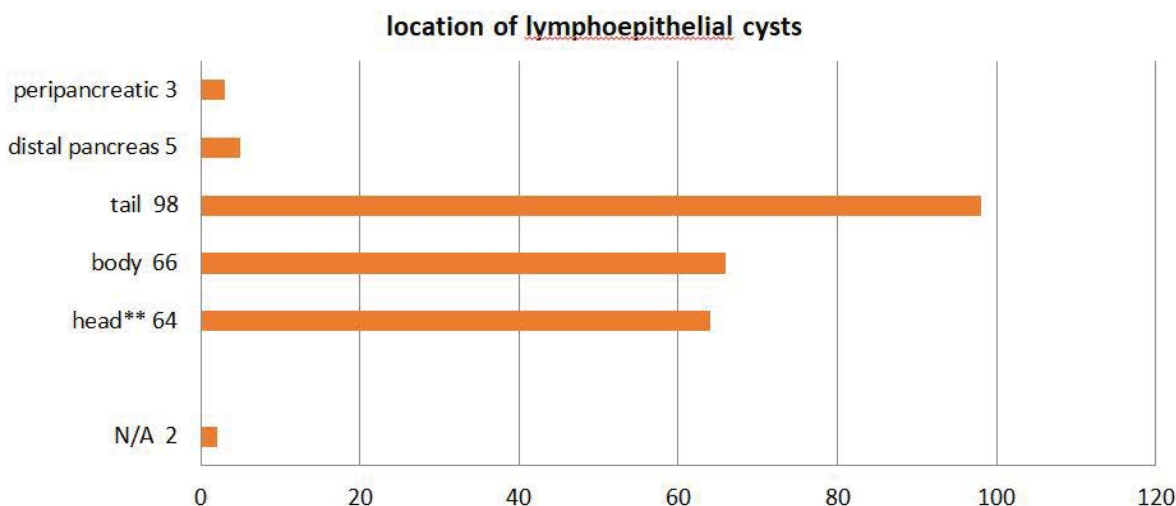


Figure 7. Location of LEC.

**including uncinata process

DIAGNOSIS OF LEC

Interventional Biopsy and Fluid Analysis (EUS/CT Guided)

Most cases of LEC are diagnosed preoperatively by EUS guided biopsy and analysis of fluid for tumour markers.

Though the incidence of preoperative biopsy is increasing, only 43.8% (N=103) underwent a preoperative biopsy as part of management, with most recent cases undergoing EUS guided biopsy (**Table 6**). LEC are characteristically acellular, clear, straw –yellow or cheesy white with keratin debris and cholesterol or fat deposition. Jian *et al.* suggests

Table 5. Correlation between symptoms and size of LEC.

Size (in cm)	Till 2002 (Adsay <i>et al.</i>) (n=79/82)+	From 2003-2010 (sekwani <i>et al.</i>) (n=68/69)+	From 2011-2018 (n=76/84)+	Combined (n=223/235)+
Overall (mean, range)	4.5(1.2-17)	4.8(1.7-14.5)	5.1(1.8-19)	4.7(1.2-19)
Symptomatic (mean)	5.1	5.16	5.4**	5.2
Asymptomatic (mean)	4.4	4.48	5.8**	4.8
Size at intervention	4.6	5.1	5.1	4.9
Size at conservative management -	-	3.99	4.06	4.02

+ available

** No correlation between symptoms and size for 8 cases

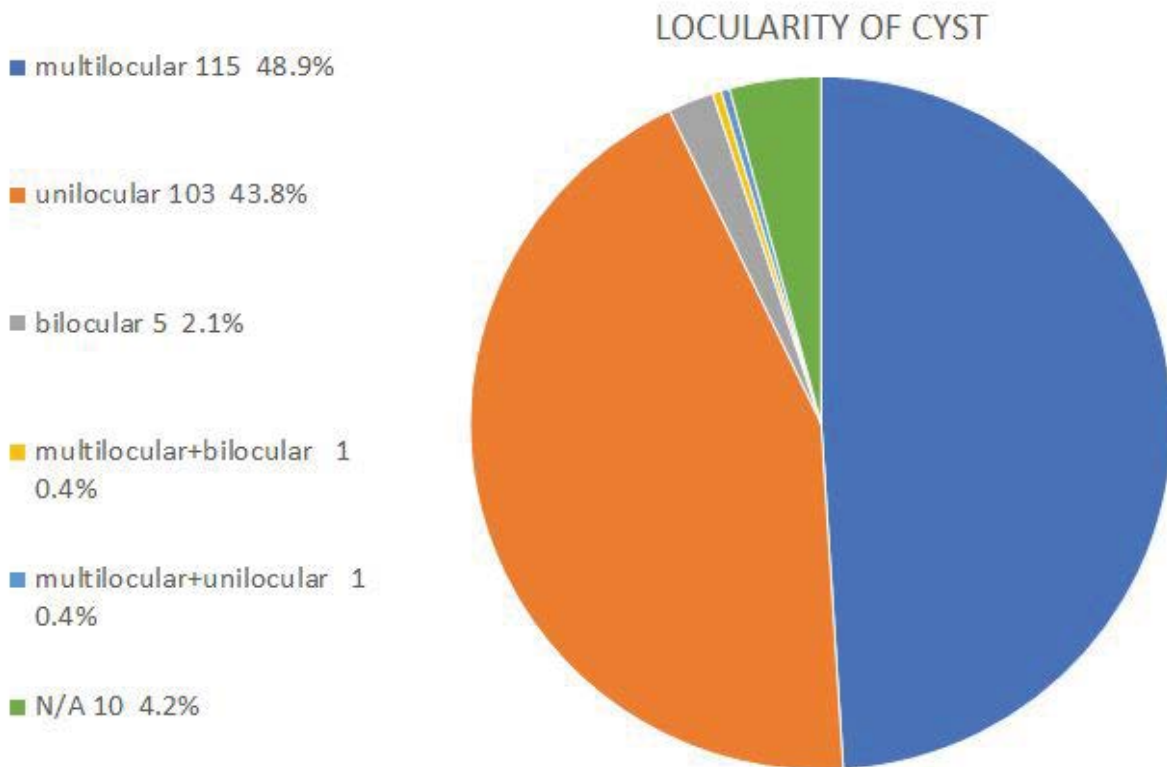


Figure 8. Morphology of LEC.

that FNA helps in accurate diagnosis obviating unnecessary surgery [16]. It is seen that though EUS guided biopsy helps to conclusively diagnose LEC, it may be inconclusive in many. EUS guided trucut biopsy has been suggested for those with equivocal results on EUS FNA to increase the yield [17].

The findings on EUS may be suggestive of LEC, suspicious of malignancy or inconclusive (**Table 7**).

Fluid CEA levels are the most commonly elevated fluid tumour marker where a tumour marker of the fluid was done (**Table 8**). CEA levels may often be elevated due to goblet cells or the aberrant immunoreactive squamous epithelial lining [15]. Therefore an algorithmic approach for diagnosis of mucinous neoplasm with no solid component on EUS and cyst fluid CEA level of more than 200ng/mL, may not hold good if LEC is also borne in mind [18].

CT Imaging

CT imaging is associated with varied presentations. This may range from characteristic well circumscribed, low attenuating masses with enhancing rims to lobulated,

non-enhancing and sharply demarcated lesions with focal calcifications. Most lesions are often associated with the absence of pancreatic ductal dilatation or atrophy [19]. Some lesions may also show variability like unilocularity with clear wall enhancements, regions of fat attenuation, papillary projections, small solid components, wall calcification or thin wall enhancement on conventional CT imaging [19, 20].

This variation has led to the argument that three-dimensional computed tomography (3D-CT) scan, rather than the conventional scan, may be better suited to differentiate lymphoepithelial cysts from other lesions of the pancreas [21] primarily because of their predominantly extra-pancreatic 3D location and higher precontrast CT attenuation. Moreover, it is to be noted that LEC are seen to be smaller and more frequently micro lobulated than mucinous cystadenomas [22].

MRI

MRI has been proposed as an accurate investigatory tool in case of equivocal findings on EUS. This is primarily due to its characteristic, high signal intensity on T1 and

Table 6. Definite diagnosis of LEC.

	Till 2002 (Adsay <i>et al.</i>) (n=82)	From 2003-2010 (Sekwani <i>et al.</i>) (n=69)	From 2011-2018 (n=84)	Combined
Preoperative biopsy	14 (11-CT, 3-EUS)	42(41-EUS, 1-CT)	47(EUS)	103
Preoperative definite diagnosis by EUS biopsy	7	34	24	65
Preoperative diagnosis by MRI only	-	-	2	2
Preoperative diagnosis by CT only	-	1	-	1
Intraoperative **	64	27	37	128
Autopsy*	4	-	-	4

** intraoperative diagnosis implies the detection of creamy white fluid without any skin appendages and thin wall which was subsequently confirmed by HPE without definite preoperative diagnosis

Table 7. Findings on preoperative cytology and fluid analysis.

Findings	Till 2002 (Adsay <i>et al.</i>) (n= 14/82)	From 2003-2010 (Sekwani <i>et al.</i>) (n=42/69)	From 2011-2018 (n=47/84)	Combined (n=103/233)
Inconclusive	7	4	6	17
Suggestive of malignancy	-	4	17	21
Suggestive/consistent of LEC**	7	34	24	65

Findings on EUS /CTguided biopsy

**-suggestive /conclusive of LEC -biopsy containing lymphocytes, epithelial debris, cream or tan coloured fluid or fat globules

Table 8. Fluid tumour levels in LEC.

	Till 2002	From 2003 -2010	From 2011 -2018	Combined
Raised fluid tumour markers + (no of pts(Range))	4	8	9	21(pts)
-F.CEA	3 (5000-26, 880) ng/mL	8 (6.5-164971) ng%	7 (300-61,687) ng%	18
-F.CA19-9	3 (64-5x10 ⁶)	-	2 (148-4410 iu/mL)	5
-OTHERS	2	2	4	8
• LDH	1	-	-	1
• Lipase	1	-	1	2
• amylase	-	2	3	5

+ patient may have raise in more than one tumour marker

low signal intensity on T2 weighted imaging. Definite MRI characteristics include “cheerio’s” appearance of multiple central hypo intensity with peripheral hyper intensity in T2 phase [22], profound water restriction on Diffusion weighted imaging (DWI) [23], or slight signal reduction in out-of-phase when compared to in-phase, because of intraregional variations in fat and water [24].

ERCP

ERCP is not useful to diagnose LEC. It is mostly done when other cystic lesions like IPMN are suspected. Most were described in older case reports where an ERCP failed to show any associated abnormality or communication in the pancreatic duct.

Serum Tumour Markers

LEC is associated with increased serum and fluid tumour markers which cause diagnostic dilemma especially in equivocal cases. 34.8% (n=82) of cases had serological tumour markers (S.CEA, S.CA19-9 or DUPAN-2) done, of whom 67.07% (n=55) had at least one marker increased beyond normal limits. S. CA19-9 levels were the most common tumour markers elevated with a wide range of values (range-43- 9432 iu/mL). It occurred in 72.7% (n=40) of those with elevated tumour markers followed by S.CEA (range- 5-1582 ng/mL) (Table 9). It is interesting to note that there is a fall in most cases of CA19-9 after surgical excision in patients with elevated CA19-9 levels.

Treatment

Though a conservative approach is the ideal treatment in asymptomatic preoperatively diagnosed cases of LEC, it was done in only 11.5% of cases (n=27) overall. Most cases of LEC were offered surgery. The indications for surgery include previously diagnosed LEC cysts becoming symptomatic over time, diagnostic uncertainty or suspicion of malignancy. From our analysis, it is seen that local excision of the cyst alone (n=90, 38.2%) and distal pancreatic resection (n=90, 38.2%) were the common procedures performed for symptomatic cysts (Table 10).

Pancreas preserving procedures like local excision, in patients with a definite diagnosis, obviate the need for morbid pancreatic resection. Newer approaches like laparoscopy and robotic surgery have been tried in an effort to further reduce the morbidity of these procedures.

Post Treatment Follow Up

Of all patients on a non-operative “wait and watch” approach, data of the follow up was available for 51.8% (n=14) of these patients with a mean follow up of 26.14 months (range-3-62months). Most of the patients (85.7%) who were on conservative wait and watch reported no increase in size. However, very rarely, increase in size of cyst resulting in symptoms necessitating surgery was seen as was spontaneous resolution [17, 25]. Follow up reports after surgery was available for 39% (n=78) of patients

Table 9. Serum tumour marker analysis in patients with LEC.

	Till 2002 (n=25/82)+	From 2003-2010 (n=25/69)	From 2011-2018 (n=32/84)	Combined (82/235)
Increased TM(No of pts)	23	16	16	55
-not specified*	10			10
-s.CA19-9(N<37 1u/ml)	11(46-9432 iu/mL)	14(64-841.9)	15(43-1730)	40
-s.CEA(N<5 ng/ml)	1	3	2	6
s.amylase(N-30-80 iu/ml)	2	-	1	3
-S.ALT/AST(N-30-80 iu/ml)	1	-	1	1
-s. Dupan2(N<400 iu/ml)	-	-	1	1
-s.Span1(N<30iu/ml)	1	-	2	3
s.72-4(N<7iu/ml)	1	1	-	2
Normal marker level	2	9	16	27
Not available in reports	57	44	52	153

* not specified indicates elevation of tumour marker(s) .exact tumour marker not specified.

+ (n=) indicates number of cases tested for tumour marker

Table 10. Treatment of LEC.

Treatment modality	Till 2002 (n=82)	From 2003-2010 (n=69)	From 2011-2018 (n=84)	Combined
Distal Resection Procedures	32	20	38	90(38.2%)
· Distal Pancreatectomy alone (DP)	19	5	21	45
· Distal Pancreatectomy alone (DP)+ LND	-	-	1	1
· Distal pancreatectomy+splenectomy (DP+S)	11	12	7	30
· Distalpancreatectomy+splenectomy+cholecystectomy (DP+S+C)	1	1	-	2
· Laparoscopic distal pancreatectomy alone (LDP)	-	-	2	2
· Laparoscopic distal pancreatectomy +splenectomy (LDP+S)		2	6	8
· Median pancreatectomy (MP)	1	-	1	2
Enucleation/Excision/Extirpation	38	30	22	90(38.2%)
· Simple open excision (E)	35	28	20	83
· Excision+choleodochooduodenotomy (E+CDD)	1	-	-	1
· Excision+Left lateral hepatectomy+cholecystectomy (E+LLH+C)	1	-	-	1
· Excision+Distal gastrectomy (E+DG)	1	-	-	1
· Excision+Distal gastrectomy+ splenectomy (E+DG+S)	-	1		1
· Robotic excision (R-E)	-	1	1	2
· Laparoscopic excision (L-E)	-	-	1	1
Enucleation + Distal Resection	1	-	-	1(0.4%)
· Excision+ distal pancreatectomy &splenectomy (E+DP+S)	1	-	-	1
Head Resection Procedures	4	6	9	19(8.08%)
· Whipples pancreaticoduodenectomy (WP)	4	6	8	18
· Whipples+vascular resection (WP+VR)	-	-	1	1
Others	7	-	1	8(3.4%)
· Autopsy (A)	4	-	-	4
· Peritoneal drainage (PD)	2	-	1	3
· Not available (NA)	1	-	-	1
Conservative	-	13	14	27(11.5%)

with a median follow up of 7.5 months (range-1 day -125 months). Most common complications after pancreatic resection included pulmonary complications, pancreatic fistula (most common after a distal pancreatectomy) which was usually self-limiting, bleeding, pseudocyst of pancreas, and cyst spillage during surgery.

HISTOLOGY

The gold standard for diagnosis of LEC is histopathology which is quite characteristic with its cheesy, white, greasy porridge like material contained by multiple septations and a thin wall of squamous epithelium with surrounding lymphoid follicles. Microscopy usually reveals absence of skin appendages like hair which is vital to differentiate

it from dermoid cyst. Sebaceous differentiation of the epithelium may be present, but is rare [26, 27]. The organism *S. Heidelberg et al.* has been found in the cyst [28] raising speculation on the presence of infection as a causative factor. However, its exact role is unknown and is not reported in other reports (**Figure 9**).

AETIOLOGY

Though the exact aetiology of these cysts is unclear, the following hypotheses are considered. Troung's hypothesis on the histogenesis of LEC include the following [29]:

Proliferation of the ectopic remnant of a brachial cyst in the pancreas. This theory is highly unlikely due to the intraabdominal nature of lesion.

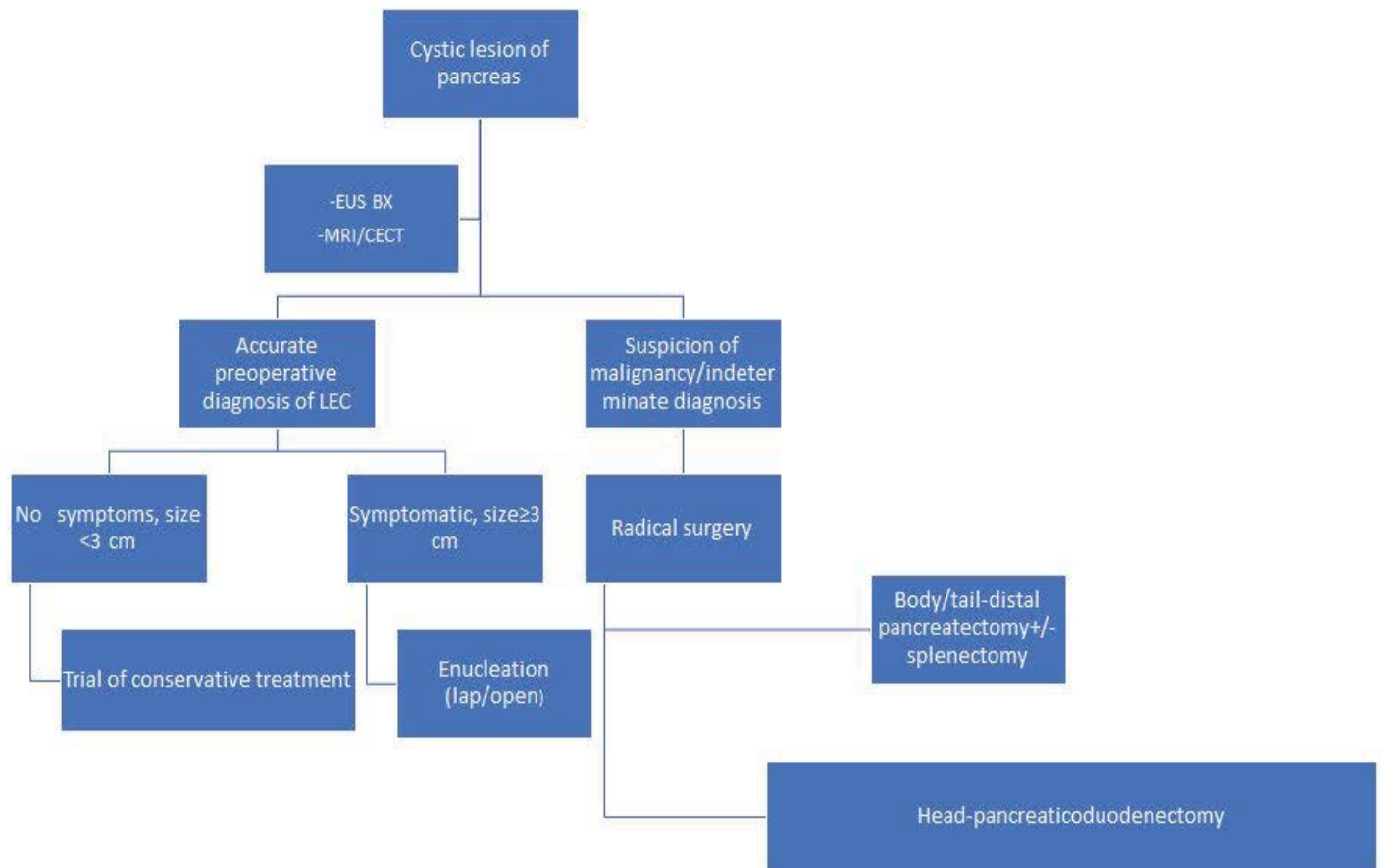


Figure 9: Treatment algorithm for LEC.

Squamous metaplasia of an obstructed pancreatic duct followed by protrusion into the peripancreatic lymph nodes

Squamous metaplasia of ectopic pancreatic tissue in a peripancreatic lymph node. This theory is most likely and is supported by evidence [6] including the eccentric location at the pancreas [7] and the occurrence in peripancreatic lymph nodes [10, 29].

Epithelial antigen attraction by lymphocytes induces the differentiation into squamous cells with surrounding lymphocytes [30, 31].

There has been an active interest into whether an association with various viruses like EBV, HIV etc. is present. So far, though there are some case reports of occurrence of LEC in HIV patients, further evidence is lacking [31, 32].

CONCLUSION

Based on our findings and other reports, a reasonable treatment algorithm for lymphoepithelial cysts of pancreas would be as in figure 9 [15].

Conflict of Interest

Authors declared no conflict of interest and financial disclosure.

References

1. Adsay NV, Hasteh F, Cheng JD, Bejarano PA, Lauwers GY, Batts KP, et al. Lymphoepithelial cyst of the pancreas: a report of 12 cases and a review of the literature. *Mod Pathol* 2002; 15:492-501. [PMID: 12011254]
2. Sewkani A, Purohit D, Singh V, Jain A, Varshney R, Varshney S. Lymphoepithelial cyst of the pancreas: a rare case report and review of literature. *Indian J Surg* 2010; 72:427-432. [PMID: 22131649]
3. Davidson ED, Campbell WG, Hersh T. Epidermoid splenic occurring in an intrapancreatic accessory spleen. *Dig Dis Sci* 1980; 25:964-967. [PMID: 7449592]
4. Yamada K, Murao S, Yoshida H, Nakajima T, Yoshii M, Kimujra M, et al. A case of accessory splenic epidermoid cyst [in Japanese]. *Nippon Nuiku Gakkai Zasshi* 1981; 70:1007-1011. [PMID: 7288251]
5. Jibu T, Nagai H, Senba D, Wada Y, Kuroda A, Moriyoaka Y, et al. A case of epidermoid cyst occurring in an intrapancreatic accessory spleen [in Japanese]. *Nihon Shokakibyō Gakkai Zasshi* 1987; 84:1859-1862. [PMID: 3323581]
6. Carr RF, Tang CK, Carrozza MJ, Rodriguez FC. Unusual cystic epithelial choristoma in a celiac lymph node. *Hum Pathol* 1987; 18:866-869. [PMID: 3610139]
7. Morohoshi T, Hamamoto T, Kunimura T, Yoshida E, Kanda M, Funo K, et al. Epidermoid cyst, derived from an accessory spleen in the pancreas: a case report with literature survey. *Acta Pathol Jpn* 1991; 41:916-921. [PMID: 1785350]
8. Horie Y, Taguchi K, Akagi T, Ohta T. Lymphoepithelial cyst in peripancreatic lymph node. *J Okayama Surg Pathol Assoc* 1990; 27:53-57.
9. Matsuno H. Cited by Morohoshi T (ref. 7)
10. Arai T, Kino I, Nakamura S, Ogawa H. Epidermal inclusion in abdominal lymph nodes. *Acta Pathol Jpn* 1992; 42:126-129. [PMID: 1561883]
11. Ohta T, Nagakawa T, Fukushima W, Ueno K, Kayahara M, Kanno M, et al. Carbohydrate Antigen 19-9-Producing Lymphoepithelial Cyst of the Pancreas: A Case Report with an Immunohistochemical Study. *Dig Surg* 1992; 9:221-225.

12. Truong LD, Stewart MG, Hao H, Yutani C, Jordan PH. A comprehensive characterization of lymphoepithelial cyst associated with the pancreas. *Am J Surg* 1995;170:27-32.
13. Dalal KS, DeWitt JM, Sherman S, Cramer HM, Tirkes T, Al-Haddad MA. Endoscopic ultrasound characteristics of pancreatic lymphoepithelial cysts: A case series from a large referral center. *Endosc Ultrasound* 2016; 5:248-253. [PMID: 27503157]
14. Nasr J, Sanders M, Fasanella K, Khalid A, McGrath K. Lymphoepithelial cyst of the pancreas: an EUS case series. *Gastrointest Endosc* 2008; 68:170-173. [PMID: 18513719]
15. Raval JS, Zeh HJ, Moser AJ, Lee KK, Sanders MK, Navina S, et al. Pancreatic lymphoepithelial cysts express CEA and can contain mucous cells: potential pitfalls in the preoperative diagnosis. *Mod Pathol* 2010; 23:1467-1476. [PMID: 20802468]
16. Jian B, Kimbrell HZ, Sepulveda A, Yu G. Lymphoepithelial cysts of the pancreas: endosonography-guided fine needle aspiration. *Diagn Cytopathol* 2008; 36:662-665. [PMID: 18677749]
17. Ali S, Wilkinson N, Jensen CS, Gerke H. EUS-guided Trucut biopsies may enable the diagnosis of lymphoepithelial cysts of the pancreas. Report of two cases. *JOP* 2009; 10:409-412. [PMID: 19581745]
18. Vignesh S, Brugge WR. Endoscopic diagnosis and treatment of pancreatic cysts. *J Clin Gastroenterol* 2008; 42:493-506. [PMID: 18344889]
19. Kim WH, Lee JY, Park HS, Won HJ, Kim YH, Choi JY, et al. Lymphoepithelial cyst of the pancreas: comparison of CT findings with other pancreatic cystic lesions. *Abdom Imaging* 2013; 38:324-330. [PMID: 22610041]
20. Policarpio-Nicolas ML, Shami VM, Kahaleh M, Adams RB, Mallery S, Stanley MW, et al. Fine-needle aspiration cytology of pancreatic lymphoepithelial cysts. *Cancer* 2006; 108:501-506. [PMID: 17063496]
21. Hebert-Magee S, Garvin D, Ahlawat S, Haddad N. Lymphoepithelial cyst of the pancreas with sebaceous differentiation: cytologic diagnosis by fine-needle aspiration. *Diagn Cytopathol* 2009; 37:937-939. [PMID: 19795493]
22. Matrone A, Russo M, Mollica C, Lombardi D, Lombardi G, Maurea S, et al. Lymphoepithelial pancreatic cyst: an atypical benign pancreatic mass presenting with a 'cheerios-like' appearance. *JOP* 2010; 11:170-172. [PMID: 20208329]
23. Nam SJ, Hwang HK, Kim H, Yu JS, Yoon DS, Chung JJ, et al. Lymphoepithelial cysts in the pancreas: MRI of two cases with emphasis of diffusion-weighted imaging characteristics. *J Magn Reson Imaging* 2010; 32:692-696. [PMID: 20815068]
24. Kudo D, Hashimoto N, Toyoki Y, Narumi S, Hakamada K. Usefulness of in-phase and out-of-phase magnetic resonance imaging for the detection of pancreatic lymphoepithelial cyst. *Hepatogastroenterology* 2011; 58:1403-1405. [PMID: 21937416]
25. Fitko R, Kampmeier PA, Batti FH, Benjaya RA, Rao SM. Lymphoepithelial cyst of the pancreas with sebaceous differentiation. *Int J Pancreatol* 1994; 15:145-147. [PMID: 8071572]
26. Fujiwara H, Kohno N, Nakaya S, Ishikawa Y. Lymphoepithelial cyst of the pancreas with sebaceous differentiation. *J Gastroenterol* 2000; 35:396-401. [PMID: 10832677]
27. Worrall NK, Drebin JA. Pancreaticoduodenectomy for lymphoepithelial cyst of the pancreas. *Am Surg* 2000; 66:732-734. [PMID: 10966028]
28. Younus S, Bleibel W, Bleibel H, Hernady N. Lymphoepithelial cyst of the pancreas. *Dig Dis Sci* 2007; 52:3136-3139. [PMID: 17909972]
29. Sako S, Isozaki H, Hara H, Tsutsumi A, Tanigawa N. Cystic lymphoepithelial lesions of the pancreas and peripancreatic region: report of two cases. *Surg Today* 1999; 29:467-471. [PMID: 10333422]
30. Capitanich P, Lovaldi ML, Medrano M, Malizia P, Herrera J, Celeste F et al. Lymphoepithelial cyst of the pancreas: a case report and review of the literature. *J Gastrointest Surg* 2004; 8:342-345. [PMID: 15019932]
31. Bédât B, Genevay M, Dumonceau JM, Frossard JL, Forget J, Morel P, et al. Association between lymphoepithelial cysts of the pancreas and HIV infection. *Pancreatol* 2012; 12:61-64. [PMID: 22487477]
32. Schwarz RE, Weiss LM. Lymphoepithelial cyst of the pancreas. No evidence for Epstein-Barr virus-related pathogenesis. *Int J Pancreatol* 1999; 25:223-227. [PMID: 10453424]

Supplementary File

CASES TILL 2002

Adsay et al¹ in 2002 described a series of 64 cases of lymphoepithelial cysts in literature. However, on detailed evaluation, 21 additional cases were found in the period till 2002 which were added and three cases were deleted* (due to duplication and misinterpretation).

Year of publication	Author	No.of cases described	No of case reports removed *	No of new cases added by us.	Total no of cases
Till 2002	Adsay et al[1]	64	2 (Sako ²⁹)+1 (Troung ¹²)	21**	82

**including three cases previously included in sekwani et al .These cases were added in this subgroup as they were published in 2002.

List of new cases added (TILL 2002)

Year of publication	Author (et al)	No.of cases reported in article
1980	Davidson[3]	1
1981	Yamada[4]	1
1987	Jibu[5]	1
1987	Caarr[6]	1
1987	Matsuno [9]	1
1990	Horie[8]	1
1991	Morohoshi[7]	1
1992	Arai [10]	2
1992	Ohta[11]	1
1994	Maast[35]	1
1994	Ueno 2 [36]	1
1996	Iacano2 [37]	1
1996	Kim2 [38]	1
1996	Takamatsu [39]	1
1996	Hamamoto [40]	1
2000	Ryo [41]	1
2001	Park Ha [42]	1
2002	Chatelain [43]	2
2002	Imamura [44]	1

CASES FROM 2003-2010

Sekwani et al ² in 2010 described an additional 28 cases to bring the tally then to 92. However , a detailed analysis revealed an additional 44 cases till 2010 which were then added .

Year of publication	Author	No.of cases described	No of case reports removed **	No of new cases added by us	Total no of cases
2003-2010	Sekwani et al [2]	28	3	44	69

List of new cases added -44. **3 cases described by sekwani² were added in the previous group(-2002) as they were published in 2002.

Year of publication	Author (et al)	No of cases reported in article
2003	Futamura [45]	1
2005	Shigeta [46]	1
2006	Policarpo-nicolas [20]	4
2007	Frazer [47]	1
2008	Nasr[14] 14	9
2008	Jian 16	3
2008	Zhu LC [48]	4
2008	Kamoda [49]	1
2009	Ali [17]	2
2009	Fukunaga [50]	1
2009	H Maekawa [131]	1
2009	Hebert magee [21]	1
2009	Matrone[22]	1
2009	Karim [51]	1
2010	Raval 15	9
2010	Nam 23	2
2010	Alcade [52]	1
2010	Toumi [53]	1

CASES FROM 2011

Since 2011, our search revealed an additional 84 cases which were also analysed(including our case) bringing the total number to 235.

Year of publication	Author	No.of cases described	No of case reports removed	No of cases added by us	Total no of cases
2011-2018	-	-	-	84*	84

*including our case

Year of publication	Author (et al)	No of cases reported in article
2011	Clemente [54]	1
2011	Kudo[24]	1
2011	England [55]	1
2012	Bedet [31]	2
2012	Domen [56]	1
2012	Foleys [57]	1
2012	Ibrahim [58]	2
2013	Kim 19	8
2013	Kavuturu [59]	6
2013	Yanagimoto [60]	1
2013	Matsumoto [61]	2
2014	Mege [62]	3
2014	Sasaki [63]	1
2014	Mitsubayashi [64]	1
2014	Konstantinidis [65]	8
2014	Terakawa [66]	4
2014	Martin [67]	6
2015	Satoh [68]	1
2016	Arumugam [69]	1
2016	Hiromitsu[70]	1
2016	Adike [71]	1
2016	Ryo [72]	1
2016	P Chadwick [73]	1
2016	Ruggero [74]	1
2016	Ho [75]	1
2016	Dalal 13	16

2016	Lipinska [76]	2
2016	Kendall [77]	1
2016	Magdeleno [78]	1
2016	Williamson [79]	4
2017	Our case	1
2017	Hassan SS [80]	1
2017	Samuel [81]	1

All the cases described were studied individually to get more information including year of publication, region, patient age, sex, symptomology, cyst location, cyst type, cyst fluid analysis, serum tumour markers, management, post operative course and a comprehensive analysis of the cases was done. Cases which were reported in other languages which were described in literature were translated to English to derive the information required. (table).

References

33. Luchtrath H, Schriefers KH. A pancreatic cyst with features of a so-called branchiogenic cyst. *Pathologe* 1985;6:217-9.
34. Yamamoto, K., Fujimoto, K., Matsushiro, T. et al. *Gastroenterol Jpn* (1990) 25: 758. <https://doi.org/10.1007/BF02779192>
35. Maass, C. M. Fronticelli, L. Macri et al. Lymphoepithelial cyst of the pancreas: radiological and pathological findings. *Abdominal radiology Eur. Radiol.* 5,448-450 (1995).
36. Ueno S, Muranaka T, Maekawa S, Masuda Y, Ro T, Saku M, et al. Radiographic features in lymphoepithelial cyst of the pancreas. *Abdom Imaging* 1994;19:232-4.
37. Iacono C, Zamboni G, Di Marcello R, Zicari M, Maran M, Montresor E, et al. Dermoid cyst of the head of the pancreas area. *Int J Pancreatol* 1993;14:269-73.
38. Kim YH, Auh YH, Kim KW, Lee MG, Kim KS, Park SY. Lymphoepithelial cysts of the pancreas: CT and sonographic findings. *Abdom Imaging* 1998;23:185-7.
39. Takamatsu S, Maruyama M. Lymphoepithelial cyst of the pancreas. *J Hep Bil Pancr Surg* (1996) 3:485-490.
40. Hamamoto I. Extrapancreatic lymphoepithelial cyst of the pancreas. *J Hep Bil Pancr Surg* (1996) 3:186-191.
41. Kwang Hyun Ryu. A Case of a Lymphoepithelial Cyst of the Pancreas. *Korean J Gastrointest Endosc* 2000; 20: 218-221.
42. Park Ha, Lee Kang Hoon, Hyung Song. Lymphocytic cyst of the pancreas: a case report. *Korean Journal of Radiology* 2001; 44: 217-219.
43. Chatelain D, Couvelard A, Hammel P, Terris B, Palazzo L, Verhaeghe P et al (2002) Lympho-epithelial cyst of the pancreas: a difficult diagnosis. About two cases. *Gastroenterol Clin Biol* 26:935-938.
44. Imamura H, Tada S, Hirota K, Suko H, Kamio T. (2002) Forty-six months follow up of a patient with pancreatic lymphoepithelial cyst. *Nippon Shokakibyo Gakkai Zasshi* 99:527-532.
45. Futamura M et al. A case of pancreatic lymphoepithelial cyst. *Nichirin-gai-kai-shi* 2003; 64 (7) :1745 - 1748.
46. Shigeta S. *Nisshō-gaikaishi* 2005;38 (4): 447 - 451
47. Fraser L et al: Lymphoepithelial cyst of the pancreas. A case report. *Scottish medical journal* (2007);52(3):53-58.

48. Zhu LC, Grieco V (2008) Diagnostic value of unusual gross appearance of aspirated material from endoscopic ultrasound guided fine needle aspiration of pancreatic and peripancreatic cystic lesions. *Acta Cytol* 52(5):535–540.
49. Kamoda Y, Fujino Y, Ueda T, Yasuda T, Matsumoto I. Lymphoepithelial cysts of pancreas. A preoperatively diagnosed case. *Journal of the Japan Pancreas Society*. 2007; Abstracts :113.
50. Fukunaga N, Ishikawa M, Minato T, et al. Lymphoepithelial cyst of the pancreas that was difficult to distinguish from branch duct-type intraductal papillary mucinous neoplasm: report of a case. *Surg Today*. 2009;39:901-904.
51. Karim Z, Walker B, Lam E: Lymphoepithelial cysts of the pancreas: the use of endoscopic ultrasound-guided fine-needle aspiration in diagnosis. *Can J Gastroenterol* 2010;24:348–350
52. Alcalde Quirós MJ, Catellote Caixal M, Feliu Villaro F, Raventos Estelle A, Caro Tarrago A, Vicente Guillen V: Lymphoepithelial cyst of the pancreas mimicking a cystic neoplasm. *Rev Esp Enferm Dig* 2010;102:63–65.
53. Toumi Z, Ammori MB, Al-Habba S, Filobos R, Ammori BJ: Laparoscopic distal pancreatectomy for a large pancreatic lymphoepithelial cyst: a rare entity. *Surg Laparosc Endosc Percutan Tech* 2010;20:e211–e214
54. Clemente G, Sarno G, De Rose AM, et al. Lymphoepithelial cyst of the pancreas: case report and review of the literature. *Acta Gastroenterol Belg*. 2011;74:343-346
55. England GM et al: Selected Case from the Arkadi M. Rywlin International Pathology Slide Seminar Benign Lymphoepithelial Cyst, Head of Pancreas. *Adv Anat Pathol* 2011;18:98–100.
56. Domen H, Ohara M, Kimura N, Takahashi M, Yamabuki T, Komuro K, et al: Lymphoepithelial cyst of the pancreas. *Case Rep Gastroenterol* 2012;6:604–611.
57. Foley KG, Christian A, Roberts SA: EUS-FNA diagnosis of a pancreatic lymphoepithelial cyst: three-year imaging follow-up. *JOP* 2012;13:681–683.
58. M Ibrahim Getso K, Ibrahim A, Mohammad A, Mohammad B: Lymphoepithelial cyst of the pancreas in female children—report of two cases. *Journal of Pediatric Surgery* (2012); 47, E51–E54
59. Kavuturu et al: Can preoperative imaging distinguish this benign lesion from malignant or premalignant cystic pancreatic lesions?. *JOP* 2013;14(3):250-255
60. Yanagimoto H, Sato S, Toyokawa H, Yamamoto T, Hirooka S, Yui R, et al: Laparoscopic distal pancreatectomy for a pancreatic lymphoepithelial cyst: case report and review of literature. *JOP* 2013;14:664–668.
61. Matsumoto K, Kato H, Tomoda T, Sakakihara I, Noma Y, Yamamoto N, et al: Two cases of lymphoepithelial cyst of the pancreas confirmed by contrast-enhanced endoscopic ultrasound. *Nihon Shokakibyō Gakkai Zasshi* 2013;110:1823–1830.
62. Mege D et al: Lymphoepithelial Cyst of the Pancreas. An Analysis of 117 Patients. *Pancreas* 2014; 43: 987-994.
63. Sasaki S, Sueyoshi N, Yamaoka Y, Yano Y, Hiroyoshi Y, Yoshinaka H, et al: Case with gradually enlarging lymphoepithelial cyst of the pancreas that necessitated enucleation. *Nihon Shokakibyō Gakkai Zasshi* 2014;111:326–333.
64. Matsubayashi Hiroyuki et al. Rupture of a pancreatic LEC during EUS-FNA... *Endoscopy* 2014; 46: E51–E52.
65. I T Konstantinidis et al: Lymphoepithelial cysts and cystic lymphangiomas: Underrecognized benign cystic lesions of the pancreas. *World J Gastrointest Surg* 2014 July 27; 6(7): 136-141 DOI: 10.4240/wjgs.v6.i7.136
66. Terakawa H et al: Clinical and radiological feature of lymphoepithelial cyst of the pancreas. *World J Gastroenterol* 2014 December 7; 20(45): 17247-17253 DOI:10.3748/wjg.v20.i45.1724758.
67. Martin J et al: Lymphoepithelial cysts of the pancreas: A management dilemma. *HepatoBiliary Pancreat Dis Int* 2014;13:539-544

68. Satoh D : . Enlarging lymphoepithelial cyst of the pancreas during 12 months of observation: report of a case.Surg Today (2015) 45:101–104.DOI 10.1007/s00595-014-0960-y60.
69. Arumugamam P et al: Lymphoepithelial Cyst of the Pancreas. Case Rep Gastroenterol 2016;10:181–192 DOI:10.1159/000445373
70. HiromitsuMaehira , HisanoriShiomi, Koichiro Murakami, HiroyaAkabori, Shigeyuki Naka, MitsuakiIshidaMasajiTani. Lymphoepithelial cyst with sebaceous glands of the pancreas: a case report.Surgical Case Reports (2016) 2:98 DOI :10.1186/s40792-016-0228-4
71. AAdike, Jennifer L. Horsley-Silva, Neha D, Christopher RC, Dora M. Lam-Himlin, Cuong C. Nguyen.An Unusual Suspect: Lymphoepithelial Cyst of the Pancreas. Case Reports in Gastrointestinal MedicineVolume 2016, Article ID 5492824, 3 pageshttp://dx.doi.org/10.1155/2016/5492824
72. D. H. Ryu, R. H. Sung, M. H. Kangand J. W. Choi. Lymphoepithelial cyst of the pancreas mimicking malignant cystic tumour. Report of a case .HPB 2016, 18 (S1), e1ee384e342 Electronic Poster Abstracts
73. Chadwick P, Spitz F, Kwa DM, Johnson , Heymann WR. Bullous Pemphigoid Associated With a Lymphoepithelial Cyst of the Pancreas .Cutis2016;98(4):264-268
74. Ruggero JM et al: Symptomatic lymphoepithelial cyst of the pancreas:successful treatment without pancreatic resection. Journal of Surgical Case Reports, 2016;4, 1–3.doi: 10.1093/jscr/rjw061
75. Ho M H et al : Successful Laparoscopic Spleen preserving Distal Pancreatectomy for a HugeLymphoepithelial Cyst of the Pancreas Tail in a Young Man: A Case Report andLiterature Review. Med Sci 2016;36(3):126-130 .DOI: 10.4103/1011-4564.185219
76. Lipinska.polish journal of pathology 2016. XX JubileuszowyZjazdPolskiegoTowarzystwaPatologówPatomorfologia – odmikroskopii do genu Warszawa, 2–4 czerwca 2016 r. Streszczenia 31
77. Kendall.AmSurg 2015 May;81(5):E228-9
78. Magdaleno, T. (2016, April). A Rare Presentation of an Abdominal Lymphoepithelial Cyst with New Roots.http://scholarlyworks.lvhn.org/medicine/942/
79. Williamson J M L et al: . Pancreatic Lymphoepithelial Cysts: A Short Case Series JOP. J Pancreas (Online) 2016 Jan 08; 17(1):70-74.
80. HassanSS.www.utoledo.edu/med/depts/medicine/fellowship/gastro/research/PancreaticLymphoepithelialcyst.pdf
81. Sandeep, Samuel & Singh, Amanpal& Bain, Andrew. (2017). Pancreatic Lymphoepithelial Cyst.VideoGIE.2. 10.1016/j.vgie.2017.01.013.
82. Tsuchiya Y, Suzuki S, Sakaguchi T, Kojima Y, Okamoto K, Kurachi K, *et al.* Lymphoepithelial cyst of the pancreas: report of a case. Surg Today 2000;30:856 – 60.
83. Vermeulen BJ, Widgren S, Gur V, Meyer P, Iselin C, Rohner A.Dermoid cyst of the pancreas. Case report and review of the literature. Gastroenterol Clin Biol 1990;14:1023–5.
84. Mitchell ML. Fine needle aspiration biopsy of peripancreaticlymphoepithelial cysts. Acta Cytol 1990;34:462–3.
85. Mockli GC, Stein RM. Cystic lymphoepithelial lesion of thepancreas. Arch Pathol Lab Med 990;114:85–7.
86. Kazumori H, Sizuku T, Ueki T, Uchida Y, Yamamoto S.Lymphoepithelial cyst of the pancreas. J Gastroenterol 1997;32:700–3.
87. DiCorato MP, Schned AR. A rare lymphoepithelial cyst of the pancreas. Am J Clin Pathol 1992;98:188–91.
88. Hisaoka M, Haratake J, Horie A, Yasunami Y, Kimura T.Lymphoepithelial cyst of the pancreas in a 65-year-old man. Hum Pathol 1991;22:924–6.
89. Kaiserling E, Seitz KH, Rettenmaier G, Seidel W, Kahlfuss R,Walz-Mattmuller R, *et al.* Lymphoepithelial cyst of the pancreas. Clinical, morphological, and immunohistochemicalfindings. Zentralbl Pathol 1991;137:431–8.

90. Ramsden KL, Newman J. Lymphoepithelial cyst of the pancreas. *Histopathology* 1991;18:267-8.45
91. Bastens B, Golaire M, Cappelli J, Lamy V, Dryjski J, Moisse R. Lymphoepithelial cyst of the pancreas. *Gastroenterol Clin Biol* 1992;16:808-10.
92. Yamaguchi J, Saywad N, Satoh M, Wakabayashi J, Enomoto K, Mori M. An ultrastructural observation of lymphoepithelial cyst of the pancreas. *J Clin Electron Microsc* 1992;25:5-6.
93. Cappellari JO. Fine-needle aspiration cytology of a pancreatic lymphoepithelial cyst. *Diagn Cytopathol* 1993;9:77-81.
94. De Lorenzi D, Candinas D, Flury R, Meyenberger C, Largiader F. Lymphoepithelial cyst of the pancreas. *Helvetica Chi Acta* 1993;60:131-5
95. Hausegger KW, Leitner G, Wagner C, Stangl F. Lymphoepithelial cyst of the tail of the pancreas—a case report. *Rofo Fortschr Geb Rontgenstr Neuen Bildgeb Verfahr* 1993;159:200-2.
96. Goodman P, Kumar D, Balachandran S. Lymphoepithelial cyst of the pancreas. *Abdom Imaging* 1994;19:157-9.
97. Katz DS, Scatorchia GM, Wojtowycz AR, Botash RJ. Lymphoepithelial cyst of the pancreatic head. *AJR Am J Roentgenol* 1995;165:489.
98. Koga H, Takayasu K, Mukai K, Muramatsu Y, Mizuguchi Y, Furukawa H, *et al.* CT of lymphoepithelial cysts of the pancreas. *J Comput Assist Tomogr* 1995;19:221-4.
99. Rino Y, Morohoshi T, Funo K, Imada T, Yamamoto Y, Jojima T, *et al.* Lymphoepithelial cyst of the pancreas: a preoperatively diagnosed case based on an aspiration biopsy. *Surg Today* 1995;25:1043-6
100. Shigemori C, Kihata M, Moriyama S. A case of lymphoepithelial cyst of the pancreas. *J Jpn Surg Assoc* 1995;56:2422-6.
101. Schinke-Nickl DA, Muller MF. Case report: lymphoepithelial cyst of the pancreas. *Br J Radiol* 1996;69:876-8.47.
102. Gafa R, Grandi E, Cavazzini L. Lymphoepithelial cyst of the pancreas. *J Clin Pathol* 1997;50:794-5.
103. Bolis GB, Farabi R, Liberati F, Maccio T. Lymphoepithelial cyst of the pancreas. Report of a case diagnosed by fine needle aspiration biopsy. *Acta Cytol* 1998; 42:384-6
104. Chan SP, Hatton CW, Falk GL. Lymphoepithelial cyst of the pancreas: serum markers do not help. *HPB Surg* 1998;11: 121-4.
105. Yoshihiko Fukukura; Hiroki Inoue; Nobuaki Miyazono; Yoshiki Kajiya; Case Report. Lymphoepithelial Cysts of the Pancreas: Demonstration of Lipid Component Using CT and MRI. *Journal of Computer Assisted Tomography*. 22(2):311-313, MAR 1998 PMID: [9530401](#)
106. Strapko A, Botash RJ, Murthy UK, Landas SK. Lymphoepithelial cyst of the pancreas: a case report and review of the literature. *Dig Dis Sci* 1998; 43:870-4.
107. Tateyama H, Tada T, Murase T, Fujitake S, Eimoto T. Lymphoepithelial cyst and epidermoid cyst of the accessory spleen in the pancreas. *Mod Pathol* 1998; 11:1171-7.
108. Centeno BA, Stockwell JW, Lewandrowski KB. Cyst fluid cytology and chemical features in a case of lymphoepithelial cyst of the pancreas: a rare and difficult preoperative diagnosis. *Diagn Cytopathol* 1999;21:328-30.
109. Eriguchi N, Aoyagi S, Okuda K, Imayama H, Tamae T, Fukuda S, *et al.* A case of lymphoepithelial cyst of the pancreas. *Kurume Med J* 1999;46:195-8.
110. Liu J, Shin HJ, Rubenchik I, Lang E, Lahoti S, Staerkel GA. Cytologic features of lymphoepithelial cyst of the pancreas: two preoperatively diagnosed cases based on fine-needle aspiration. *Diagn Cytopathol* 1999;21:346-50
111. Mandavilli SR, Port J, Ali SZ. Lymphoepithelial cyst (LEC) of the pancreas: cytomorphology and differential diagnosis on fine-needle aspiration (FNA). *Diagn Cytopathol* 1999;20:371-4.
112. Anagnostopoulos PV, Pipinos II, Rose WW, Elkus R. Lymphoepithelial cyst in the pancreas: a case report and review of the literature. *Dig Surg* 2000;17:309-14.
113. Jouini M, Bedioui H, Nouria K, Menif E, Haouet S, Slim R (2004) Lymphoepithelial cyst of the pancreas: a case report. *Ann Chir* 129:293-296

114. Au-Young IT, Wemyss-Holden S, Llyod DM (2004) Laparoscopic distal pancreatectomy for lymphoepithelial cyst of the pancreas. *JLS* 8:389–390
115. Barbaros U, Erbil Y, Kapran Y, Bozbora A, Ozarmagan S, Bilgic B (2004) Lymphoepithelial cyst: a rare cystic tumor of the pancreas which mimics carcinoma. *JOP* 5:392–394
116. Ciprian Corby S, Weinbreck N, Nicolas M, Laurent V, Vignaud JM, Regent D (2005) Lymphoepithelial cyst of the pancreas: a case report. *J Radiol* 86:335–336
117. Neyman EG, Georgiades CS, Horton KH, Lillemore KD, Fishman EK (2005) Lymphoepithelial cyst of the pancreas—evaluation with multidetector CT. *Clin Imaging* 29:345–347
118. Kanno A, Suzuki M, Onodera H, Suzuki S, Kayaba Y, Sasaki A et al (2005) Lymphoepithelial cyst of the pancreas: report of two cases. *Nippon Shokakibyo Gakkai Zasshi* 102:612–618
119. Castaldo ET, Stumph JR, Merchant N (2006) Lymphoepithelial cyst of the pancreas. *Surgery* 140:476–478
120. Shinmura R, Gabata T, Matsui O (2006) Lymphoepithelial cyst of the pancreas: case report with special reference to imaging— pathologic correlation. *Abdom Imaging* 31:106–109
121. Colovic R, Grubor N, Radak V, Micev M, Colovic N (2006) Lymphoepithelial cyst of the pancreas. *Srp Arh Celok Lek* 134:64–66
122. Ivicic J, Hermanova M, Vomela J (2007) Benign Lymphoepithelial cyst of the pancreas: a case report. *Rozhl Chir* 86(6):300–302
123. Idetsu A, Ojima H, Saito K, Hirayama I, Hosouchio Y, Nishida Y et al (2008) Lymphoepithelial cyst of the pancreas: report of a case. *Surg Today* 348(1):68–71
124. Frezza EE, Wachtel MS (2008) Lymphoepithelial cyst of the pancreas tail: case report and review of literature. *JOP* 9(1):46–49
125. Roger N, Rousseau G, Bardier A, Vaillant JC, Hannoun L (2008) Lymphoepithelial cyst of the pancreas: a new case report. *Gastroentérol Clin Biol* 32(67):640–644
126. Matsukawa H, Takakura N, Shiozaki S, Aoki H (2008) A case of Lymphoepithelial cyst of the pancreas. *Nippon Shokakibyo Gakkai Zasshi* 105(6):854–859
127. Kobayashi T, Shimura T, Araki K, Ogawa A, Mochida Y, Suzuki H et al (2008) Lymphoepithelial cyst of the pancreas: report of a case. *Hepatogastroenterology* 55(84):1107–1109
128. Zielinska Pajak E, Liszka L, Pajak J, Golka D, Lampe P, Pilch-Kowalczyk J et al (2008) Two cases of lymphoepithelial cyst of the pancreas: first—a cyst coexisting with a primary gastric lymphoma, second—incidentally found pancreatic cyst. *Z Gastroenterol* 46(10):1188–1193
129. Yamaguchi T, Takahashi H, Kagawa R, Takeda R, Sakata S, Yamamoto M et al (2008) Lymphoepithelial cyst of the pancreas associated with elevated CA 19-9 levels. *J Hepatobiliary Pancreat Surg* 15(6):652–654
130. Alvarez Catro AM, Molina-Perez E, Fernandez-Castrogudin J, Iglesias Garcia J, Bustamante Montalvo M, Dominguez Munoz E (2008) Lymphoepithelial cyst—a very uncommon cause of pancreatic mass. *Rev Esp Enferm Dig* 100(9):596–598
131. Langan R, Paragi P, Guarino R, Chamberlain R (2009) Lymphoepithelial cyst of the pancreas: a sheep in wolves clothing. *Am Surg* 75(6):520–522
132. Zou XP, Li YM, Li ZS, Xu GM (2004) Lymphoepithelial cyst of the pancreas: a case report. *Hepatobiliary Pancreat Dis Int* 3:155–157
133. Hiroshi Maekawa, Hisashi Yoneyama, Yoshihiro Komatsu, Hajime Orita, Mutsumi Sakurada, Koichi Sato, Miki Yamano. Pancreatic Lymphoepithelial Cyst with an Intracystic Papillary Projection. Report of a Case. *JOP. J Pancreas (Online)* 2009 Nov 5; 10(6):694-696.

Master table

Year	Country	Author	Age	Sex	Presentation	Cyst Type	Size (Cm)	L	D	Biopsy	TM	Others	Treatment	Po
1980	US	Davidson[3]	40	M	WL,N U,P	MU	5.5	T	I	N	N	N	DP+S	PO7
1981	J	Yamada[4]	51	M	P	U	6	T	I	N	N	NO	DP+S	
1985	US	Luchtract[33]	36	M	WL,L	MU	9	B	I	N	NO	NA	DP	
1987	J	Jibu[5]	37	M	P,WL, NU	U	4	T	I	N	Y-CA19- 9-N,CEA- 4.1	NO	E	
1987	J	Matsuno[9]	60	M	I	MU	4	T	I	N				
1987	US	Troung[12][12]	35	M	P,DR	U	6	B		N	NA	NA	E	PO
1987	US	Tsuchiya[82]	50	M	AS		4.5	B	I	N	Y- S.CA19- 9--8100	NO	DP	12M
1987	US	Caarr[6]	50	F	I-C	U	3	LN- CA	I	N	NA	NA	E	
1990	US	Vermulen[83]	46	M	AS	MU	NA	B	I	N	NA	N	DP	NA
1990	US	Michel[84]	42	M	P,FE	MU	6	H	I	Y-CT-- >INCONCLUS IVE	Y- INC.AMY LASE,AS T,ALT	NA	E+CDD	3M
1990	US	Mockli[85]	72	M	AS-A	BL	4	T	N	A	A	A	A	A
1990	J	Yamamoto[34]	64	M	AS	MU	4	B	I	N	INCREA SED	NO	E	
1990	J	Horie[8]	58	M	P-CT	MU	4.5	H	I	N	NA	NA	E	
1991	J	Morohoshi[7]	32	F	P	NA	6	T	I	N	N	N	E	
1991	US	Di corato[87]	43	M	AS	U	3	T	I	N	NA	ITP	DP	24 M
1991	J	Hisoka[88]	65	M	AS	MU	5	B	I	N	Y-INC.CA 19-9, SPAN 1, PAN	NA	DP+S	PO

1991	E-GER	Kaserling[89]	53	M	FAT	MU	8	T	I	Y-CT-->INCONCLUSIVE,F. CA19-9-187,F.CEA-5000,LDH-434,LIP-81	Y-S.CEA-5.5, S.CA19-9-125	NA	DP+S	PO
1991	US	Ramden[90]	73	M	AS-A	MU	2	B	N	A	A	A	A	A
1992	US	Bastens[91]	66	F	P,WL	U	4	H	I	N	NO	NO	E	PO
1992	J	Yamaguchi[92]	57	F	AS-USG,C hTr	MU	3	B	I	N	NO	NO	E	PO
1992	J	Arai[10]	48	M	I-TG	U	NA	PP LN	I	N	NA	NA	E	
1992	J	Arai[10]	62	M	I-PG	U	NA	IP LN	I	N	NA	NA	E	
1992	J	Ohta[11]	73	M	AS	MU	4	T	I	N	Y-CA19-9-127		E	NA
1993	US	Capellari[93]	44	M	P,WL	BL	6	H	I	Y-CT--> FEW LYMPHOCYTES	NO	NA	E	NA
1993	E-SW	De Lorenzo[94]	59	M	AS	U	3	H	I	N	Y-CA 50, CEA	NO	E	12M
1993	E-GER	Hausegger[95]	66	M	AS	U	5	T	I	N	NA	NA	E	10-PCP
1994	J	Fitko[25]	60	M	P	U	4.5	B	I	Y	NO	NO	E	UGIB
1994	US	Goodmann[96]	68	M	P,NU, V	MU	10	B	I	N	NO		E	
1994	US	Uena[36]	58	M	P	MU	3	B	I	N	Y-S.CA19-9-8100	NO	E	
1994	E-I	Maas[35]	74	F	AS-CT	MU	8	B	I	Y-CT-CREAMY FLUID.CA19-9-64	Y-CA19-9-1206		E	PO
1994	J	Ueno[36]	69	M	P	U	3	B	I	N	NA	NA	E	
1995	US	Katz[97]	42	F	P,FE,C h	MU	5	H	I	N	N	NA	E	PO

1995	J	Koga[98]	56	M	AS	MU	3	H	I	N	NA	NA	E	NA
1995	J	Koga[98]	62	M	AS	MU	8	H	I	N	NA	NA	WP	36 M
1995	J	Rino[99]	58	M	AS	MU	5	H	I	Y	Y	NA	E	12M
1995	J	Shigewori[100]	63	M	BP	U	10,5	H,T	I	N	Y	NO	E,DP+S	
1995	US	Troung[12]		M	AS-A	MU		H	I		NA		A	
1995	US	Troung[12]		M	AS-A	NA		B	I		NA		A	
1995	US	Troung[12]		F	P,NU	NA		T	I		NA		DP	
1996	E-I	Iacano[37]	56	M	P	U	3.5	B	I	N	NO	NA	E	45M
1996	SK	Kim[38]	26	M	P	U	4	H	I	N	Y	NA	E	PO
1996	E-I	Iacano[37]	47	M	AS	U	7	B	I	N	NO	NO	E	26M
1996	E-SW	Schinke [101]	59	M	P,DR	MU	6	H	I	N	Y	NO	E	NA
1996	J	Takamatsu[39]	68	M	AS-USG	MU	3	H	I	N	Y	NO	WPD	1M
1996	SK	Kim[38]	56	M	P-CT	MU	9	B	I	NO	CA/CEA-N	NO	E	
1996	J	Hamamoto[40]	68	M	P/DIS	MU	9	H	I	NO	CA 19-9-178,CEA-N	NO	E+DG(PUD)	80--N CA 19-9
1997	E-I	Gafaa[102]	57	M	P	U	2.5	H	I	N	NA		E	
1997	J	Kazumori[86]	48	M	FAT	MU	2.5	T	I	N	Y	NA	DP+S	PO
1998	E-I	Bolis[103]	64	M	GI	U	5.5	H	P	Y-stratified squamous epithelium with subepithelial lymphoid infiltrate and keratin material	Y	NO	E	PO
1998	AUS	Chan[104]	47	M	B,P	MU	5	H	I	Y--CT-->DEBRIS,	Y-CA19-9-46, CEA-4.5	HYDATID CYST/GB STONES	E+LLH+C	
1998	J	Fukkuwara[105]	70	M	DR	U	10	T	I	Y-INCREASED	NO		E	

										FAT CONTENT				
1998	J	Fukkuwara[105]	74	M	AS	MU	4	B	I	N	NO		E	
1998	US	Strapko[106]	42	F	P,FE,C h	MU	4	B	I	N	Y	NA	E	10D
1998	J	Tateyama[107]	59	M	AS	MU	5	T	I	N	NA	NA	DP+S	PO
1999	US	Centeno[108]	47	M	P,NU	U	2	T	I	Y-CT-- >DENSE LYMPHOCYT ES,FLUID CA 19-9 -5X106, F.CEA- 26,880,	Y- AMYLAS E-256	NA	DP+S	
1999	J	Eruguchi[109]	43	M	AS	U	7	H	P	N	NA	NO	E	PO
1999	US	Liu[110]	49	M	P	U	6	T	P	Y-EUS-- >DEBRIS	NO	NA	DP	
1999	US	Liu[110]	56	M	P,DR	U	5	T	I	Y-CT-- >DEBRIS,CC	NO	NA	E	
1999	US	Manadavalli[111]	49	F	P	MU	6	B	I	Y-CT-- >INCONCLUS IVE	NO	NA	DP+S	7 D
1999	J	Sako[29]	75	F	I-CYS	U	1.8+0 .5 LN	H	I	N	NO	NO	WP(PP)	24M
1999	J	Sako[29]	57	F	P	U	1.5+0 .8 LN CHA	B	I	N	NO	NO	DP+S	8M
1999	US	Schwartz[32]	54	M	P,BP	MU	3	T	I	N	NO	NA	DP	12M
2000	US	Anag[112]	42	M	AS-CT	U	3.8	T	I	N	NO	NO	DP+S	5W
2000	J	Fujiwara[26]	60	M	AS	U	4	T	I	N	Y-CA 19- 9 -98, CEA-N		E	CA 19-9 INCREASED AFTR SX
2000	US	Worrall[27]	61	M	P,F,M, L,DR	MU	8	H	I	N	NO	NO	WPD	PO
2000	SK	Ryu[41]	70	M	P	U	2.7	T	I	N			DP+S	PO

2001	SK	Park Ha[42]	68	M	P	MU	6.5	B	I	N			E	
2002	E-F	Chatelain[43]	50	M	AS-MRI	U	4	T	I	N			DP	
2002	E-F	Chatelain[43]	61	M	P/J	U	5	T	P	Y-EUS-INCONCLUSIVE.F.CEA-6400	S.72-4-10,000,CA19-9-5		DP+S+C	
2002	J	Imamura[44]	73	M	AS	MU	4.8	B	I	N	S.CA19-9-9432,S.CEA-N		DP	
2002	US	Adsay[1]	45	M	FE,NU,V	MU	17	T	I	N		NO	DP	
2002	US	Adsay[1]	46	F	P	U	6	T	I	N		NO	DP	
2002	US	Adsay[1]	46	F	BP,NU,W	N/A	1.5	T	I	N		NO	DP	
2002	US	Adsay[1]	45	M	P	MU	5,3.5	T	I	N		NO	DP	
2002	US	Adsay[1]	45	F	AS	N/A	1.2	H	I	N		NO	P	
2002	US	Adsay[1]	59	M	AS	BL	4.5	T	I	N		NO	DP	
2002	US	Adsay[1]	82	M	DP	N/A	3	B	I	N		NO	DP	
2002	US	Adsay[1]	74	M	N/A	N/A	5	B	I	N		NO	DP	
2002	US	Adsay[1]	63	M	N/A	MU	4.5	T	I	N		NO	DP	
2002	US	Adsay[1]	60	M	N/A	U	2.5	H	I	N		NO	P	
2002	US	Adsay[1]	58	M	AS	U	3.5	T	I	N		NO	DP	
2002	US	Adsay[1]	40	F	N/A	N/A	2	T	I	N		NO	DP	
2003	J	Futamura[[45]	74	M	AS	MU	2.5	B	I	N	S.CA19-9-64		E	SE+ CA 19-9
2004	C	Zou xp[132]	43	F	P	MU	3.8,4.4	H,T	P	Y-EUS-KERATINISED SQ CELLS, FEW LYMPHOCYTES	S.CEA-N,S.CA19-9-N	ERCP-DEVIATION OF PD BRANCHES	C	NA
2004	SA-ARG	Capitanich[30]	53	M	AS+G	U	4	T	I	N	NA	NA	DP+S+C	PO-4

					BS									
2004	A-TUN	Jouni[113]	20	F	P,V	MU	5	T	I	N	NA	NA	DP+S	PO-8
2004	UK	Au-young[114]	48	M	P	NA	2.5	T	P	Y-USG-SUGGESTIVE OF LEC	NA	NA	LAP PD+S	PF-3M
2004	TUR	Barbaros[115]	55	M	AS-UTI-CT-30HU	MU	7	T	I	N	S.CA19-9-726,CEA-N		DP	PO-25D,PF
2005	E-F	Cipran corby[116]	44	M	C,P	MU	5	T	I	N	NA	NA	DP+S	PO
2005	US	Neyman[117]	47	M	P	U	3.5	H	I	Y-SCANTY FRAGMENTS OF ATYPICAL CELLS-SUSPICIOUS OF ADENO CA	S.CA19-9-NS.CEA-NA		WPD(PP)	PO
2005	J	Kanno[118]	76	M	AS-? UGI-CT	U	3	B	I	N	NO	Abdominal MRI A low signal with TI emphasis and a non-uniform high signal (Fig. 2c) with T2 emphasis .EUS-heterogenous	DP+S	
2005	J	Kanno[118]	49	M	AS	MU	5	H	I	N	NO	:Endoscopic ultrasonographic findings revealed a multilocular cystic mass with honey comb structure and wall thickening in the head of the panc	E	
2005	J	Shigeta[46]	58	M	P	MU	7	T	I	N	S.CA19-9-841.9	NA	DP+S	CA19-9-->116.5

2006	US	Castaldo[119]	37	M	P	U	4.5	H	I	N	Y-CA19-9-N	NA	WPD(PP)	PO-6D
2006	J	Shinmura[120]	59	M	P	BL	10.4	B	I	N	Y-CA72-4--4.9	NA	E	
2006	E-SERB	Colovic[121]	49	M	P	MU	8	T	I	N	NA	NA	E	PO
2006	US	Policarpo-nicolas	33	M	P	MU	2.7	H	I		Y-EUS-SUSPICIOUS FOR MALIGNANCY		WPD	
2006	US	Policarpo-nicolas[20]	48	M	DYS	U	4	B		P-EUS	Y-EUS-CONSISTENT FOR LEC		C	C-5M, SAME SIZE
2006	US	Policarpo-nicolas[20]	58	F	P	U	1.8	T		P-EUS	Y-EUS-CONSISTENT FOR LEC		DP	
2006	US	Policarpo-nicolas[20]	63	M	P	MU	5.7	B	I		Y-EUS-MUCOID MATERIAL.F. CEA-35,028;F.AMYLASE-480;F.LIPASE-20	NA	NA	DP
2007	E-CZH	Juivic[122]	59	M	P	U	4	H	I	N	Y-INC.CA19-9	NA	E	PO-5D
2007	US	Younus[28]	53	F	P	MU	7	T	I	N	NA		DP	PO
2007	UK	Frazer[47]	63	M	WL,P,V	U	14.5	B		N			DP+S	
2008	J	Idetsu[123]	77	M	AS-MRI	MU	4	B	I	N	NA		DP+S	
2008	US	Freeza[124]	56	M	P	U	6	T	I	N	NA		DP+S	
2008	E-F	Roger[125]	54	M	AS	MU	10	H	I		Y-EUS-INCONCLUSIVE	Y-CA19-9-N,CEA-N	WPD	
2008	J	Matsukama[126]	59	M	AS	MU	4.5	B	I	N	Y-INC.CA19-9		E	
2008	J	Kobayashi[127]	55	M	AS-CT	MU	NA	B	I		Y-EUS-NEGATIVE FOR	NA	E	

										MALIGNANCY				
2008	E-P	Zelinska pajak[128]	47	M	P	U	2	H	I	N			E+D2G+SP LENECTO MY	PO-24M
2008	E-P	Zelinska pajak[128]	50	M	AS	U	4.5	B	I	Y		AAA	E	PO-42M
2008	J	Yamaguchi[129]	72	M	AS- CT/M RI	MU	6	H	I	N	Y-CA19- 9-272	NA	E	PO-60M .CA 19-9 -N
2008	E-S	Alavaraz[130]	68	M	AS- USG	U	1.8	H	I	Y-NEGATIVE FOR MALIGNANCY	NA	NA	WPD	
2008	US	Nasr[14]	46	F	WL	MU	12	T	I	Y-STRAW COLORED FLUID, F. CEA-6.5			E	
2008	US	Nasr[14]	62	M	AS	U	4.4	H	I	Y-MUCINOUS BLOODY.F.CEA-493			E	
2008	US	Nasr[14]	44	F	AS	U	1.7	T	P-EUS	Y-WHITE FROTHY, F.CEA-55			C	
2008	US	Nasr[14]	40	F	AS	U	6	H	P-EUS	Y-THICK WHITE .F.CEA- 6.5			C	
2008	US	Nasr[14]	59	M	AS	U	4.4	B	P-EUS	Y- MILKY.F.CEA- 6.5			C	
2008	US	Nasr[14]	58	M	P	U	7	B	P-EUS	Y-TAN COLORED			C	
2008	US	Nasr[14]	65	M	P	U	4.5	B	P-EUS	Y-CREAM COLORED			E	
2008	US	Nasr[14]	55	M	P	U	4.6	B	P-EUS	Y			C	
2008	US	Nasr[14]	40	F	AS	MU	3.8	T	P-EUS	Y			C	
2008	US	Jian[16]	46	M	P	MU	6.5	T	P-EUS	Y-LYMPHOCYTES, SQUAMOUS EPITHELIUM			DP+S	PO-13M
2008	US	Jian[16]	67	M		NA	6.5	T	P-EUS	Y-SQUAMOUS CELLS,DEBRIS			C	C-13M
2008	US	Jian[16]	77	M		MU	3	T	P-EUS	Y-SQUAMOUS CELLS,DEBRIS			C	C-13M

2008	US	ZhuLC[48]	42	M	P	MU	2.5	T	P-EUS	Y-TAN WHITE, SEMISOLID CHEESY ,F.CEA-164971. F.AMYLASE-2357	Y	DP+S	PO	
2008	J	Kamoda[49]	69	M	AS	MU	5	B	P-CT	Y		E		
2008	US	Zhu LC[48]	35	M	P	MU	4.6	H/B	P	Y-EUS-CLEAR YELLOW, NO EPITHELIUM, DEBRIS. F.CEA- 25.6,F.CA19-9 -N	NA	NA	E	
2008	US	Zhu LC[48]	42	F	P	MU	3.4	H	P	Y-EUS- CLEAR, DEBRIS. F.CA19-9-N, F.AMYLASE-N	NA	NA	E	
2008	US	Zhu LC[48]	51	M	J,P	MU	4.5	H	P	Y-EUS-NO FLUID, NECROTIC ADIPOSE TISSUE+, AMYLASE-N	NA	NA	E	
2009	US	Langan[131]	59	M	AS- CECT	MU	4.2	H	I	Y-EUS-THICK YELLOW FLUID, RARE ATYPIA	N-CA 19- 9-N,CEA- N	NA	WPD©	POD6
2009	US	Ali[19]	35	M	P	MU+U	2+2	B +T	P-EUS	Y-NUCLEATE CELLS, CC		C	C-3M-->DP	
2009	US	Ali[19]	54	M	P	U	2.2	B	P-EUS	Y- CELLS,DEBRI S		C	C-6M	
2009	J	Fukunaga[50]	58	F	AS- DM2	MU	4	B	I	N		DP+S	POD-19	
2009	J	Maekawa H [133]	58	M	P	U	5	B	I	N		DP	POD10	
2009	US	Hebert magee[21]	48	M	P	U	5	H	P	Y-WHITE CHEESY MATERIAL, S.GLANDS+		E		

2009	E-I	Matrone[22]	63	M	AS	MU	7	T	I	N	CEA-N,CA19-9-N		DP+S	
2009	CAN	Karim[51]	51	F	P	MU	2.6	B	P	Y	Y-CA19-9-350	NA	C	C-2 YRS
2010	US	Raval[15]	58	M	WL	U	10	B		Y	Y-S.CA19-9-51.9,S.CEA-N		E	
2010	US	Raval[15]	58	M	J	U	3.2	B		Y	N/A		E	
2010	US	Raval[15]	75	M	P	MU	3	H		Y-WHITE CHEESY	S.CA19-9-188		E	
2010	US	Raval[15]	41	F	P	MU	5	B		Y-WHITE CHEESY	N/A		E	
2010	US	Raval[15]	40	F	P,NU	MU	3	B		Y-INCONCLUSIVE	CEA-N,CA19-9-N		E	
2010	US	Raval[15]	75	M	AS	MU	3	T		Y	CEA-N,CA19-9-N		E	
2010	US	Raval[15]	59	F	AS	U	6.7	H		Y	CEA-N,CA19-9-NA		E	
2010	US	Raval[15]	66	M	AS	MU	3.5	B		Y-TAN COLORED	Y-CEA-6.4,CA19-9-509		E	
2010	US	Raval[15]	50	M	AS	U	2.5	T		Y-OPAQUE	Y-CEA-678/1091		E	
2010	SK	Nam[23]	43	F	AS	U	4.5	H	I	N	NA		E	
2010	SK	Nam[23]	45	M	AS	MU	2.2	H	I	N	Y-INCREASED CA19-9,CEA		R-E	PO-Intrabdominal spillage
2010	E-S	Alcade[52]	73	M	AS	MU	5.2	B	I	N	Y-CA19-9-INC,CEA-N		DP+S	
2010	UK	Toumi[53]	43	M	P,WL	MU	7.8	T	I	N	Y-CA19-9-152	NA	LAP DP+S	7M-PF

2010	I	Sekwani[2]	66	M	WL	U	5.2	H	I	N	Y-CA19-9-687		E	PO-18M .CA 19-9 -N
2011	E-I	Clemente[54]	62	M	AS-USG	MU	10	T	P	N	Y-CA19-9-74	NA	DP	
2011	J	Kudo[24]		M	AS-MRI	MU	3	B	P-MRI	N	Y-CA19-9-INC,CEA-N		E	
2011	AUS	England[55]	67	M	AS	MU	10	H	I	NA			WPD	
2012	E-SW	Bedet[31]	48	M	AS	MU	7	T	P-EUS	Y-SQUAMOUS CELLS,KERATIN DEBRIS		Y	DP	
2012	E-SW	Bedet[31]	45	M	WL,F E	MU	NA	T	P-EUS	Y-KERATIN DEBRIS		Y	C	C-SPONT RESOLVED
2012	J	Domen[56]	60	M	P	MU	6.5	H	I	Y-SQUAMOUS CELLS,KERATIN DEBRIS			E	
2012	UK	Foleys[57]	58	M	P	MU	3.5	T	P	Y-WHITE NECROTIC MATERIAL, ACCELULAR ASPIRATE			C	C-3 YRS
2012	NIG	Ibrahim[58]	5	F	P	MU	8	T	I	N			DP+S	PO-POD10
2012	NIG	Ibrahim[58]	6	F	J,NU,V	MU	5	H	I	N			WPD	PO-48M
2013	SK	Kim[19]		M		MU		H					E	
2013	SK	Kim[19]		M		MU		H					E	
2013	SK	Kim[19]		M		MU		B					E	
2013	SK	Kim[19]		M		MU		B					E	
2013	SK	Kim[19]		M		u		B					E	
2013	SK	Kim[19]		M		u		T					E	
2013	SK	Kim[19]		M		u		T					E	
2013	SK	Kim[19]		F		u		T					E	
2013	US	Kavuturu[59]	76	M	P	MU	4	H		Y-INCONCLUSIVE	Y-S.CA19-9-68		WPD	
2013	US	Kavuturu[59]	61	M	AS	MU	19	T		N	N/A		DP	
2013	US	Kavuturu[59]	47	M	P	MU	1.8	T		N	S.CA19-9-70		DP	

2013	US	Kavuturu[59]	63	M	P	MU	4	T		N	S.CA19-9-N		DP	
2013	US	Kavuturu[59]	63	M		MU	3.6	T		N	S.CA19-9-793		DP	
2013	US	Kavuturu[59]	76	F	AS	MU	2	T		N	S.CA19-9-N		DP	
2013	J	Yanagimoto[60]	53	M	N	U	5.5	T	I	Y-SQUAMOUS CELLS, CYST	S.CA19-9-N,DUPAN2-N		LAP DP+S	PO-PF 6 DAY
2013	J	Matsumoto[61]	65	M	AS	MU	5	H	I	N	Y-S.CA19-9-223.9, CEA-N,DUPAN2-N,SPAN1-133.7		WPD	
2013	J	Matsumoto[61]	60	F	AS	MU	4	B	I	N	Y-S.CA19-9-68.2, CEA-N,DUPAN2-N,SPAN1-37.3		DP	
2014	E-F	Mege[62]	36	M	J	U	4	H	I	N	CA19-9-450		WP+VR	PO-RF-C
2014	E-F	Mege[62]	49	F	AS-USG	U	5	T	P	Y-FLUID AMYLASE-INC,LIP-INC			DP	30M
2014	E-F	Mege[62]	65	M	AS	MU	10	H	P	N	S.CA19-9-80		E	84M
2014	J	Saski[63]	54	M	AS	MU	3.2	H	P	N			LAP E	
2014	J	Mitsubayashi[64]	69	M	P	MU	8	H	P-EUS	Y-THICK WHITE KERATIN, RUPTURE			DRAIN	D-2 YRS AFTR FNA
2014	US	Konstantinidis[65]			P	BL+MU	2	H	P	Y-CONCLUSIVE LEC		NOR	WPD	
2014	US	Konstantinidis[65]			P	U	2.9	H	P	Y-CONCLUSIVE LEC		NOR	WPD	
2014	US	Konstantinidis[65]			N	U	2	B/T	I	N		NOR	DP	
2014	US	Konstantinidis[65]			FE	U	2.8	B/T	I	N		NOR	DP	
2014	US	Konstantinidis[65]			AS	U	2	B/T	I	N		NOR	DP	
2014	US	Konstantinidis[65]			AS-->S	U	7.6	B/T	I	N		NOR	DP	
2014	US	Konstantinidis[65]			AS-->S	U	2	NA	I	N		NOR	E	

2014	J	Terakawa[66]	59	M	AS	MU	9	B	P	N	NOR		E	
2014	J	Terakawa[66]	49	F	AS	U	6	T	P	N	Y-CA19-9-298		E	
2014	J	Terakawa[66]	56	M	AS	MU	4	B	P	N	Y-CA19-9-75		E	
2014	J	Terakawa[66]	56	M	AS	MU	6	H	P	N	Y-CA19-9-96		E	
2014	US	Konstantinidis[65]			AS	U	2	NA	P	Y-EUS-PAUCICELLULAR			C	72 M
2014	UK	Martin[67]	61	M	AS-CT/MRI	U	5	B	I	Y-VISCOUS,CYT OLOGY-N	S.CA19-9-N,CEA-N		LAP DP+S	26M-PF
2014	UK	Martin[67]	58	F	AS	U	4.5	T	I	Y-VISCOUS,CYT OLOGY-N	S.CA19-9-N,CEA-N		LAP DP+S	4M-SEPSIS UR
2014	UK	Martin[67]	70	M	P	U	6.9	T	I	Y-VISCOUS,YEL LOW .F.CEA-61687,F.AMYLASE-1600	S.CA19-9-N,CEA-N		LAP DP+S	82M
2014	UK	Martin[67]	56	M	P	U	3	T	I	Y-BROWN COLOR, MUCINOUS	S.CA19-9-N,CEA-N		LAP DP+S	125M
2014	UK	Martin[67]	62	M	AS	MU	5	T	I	Y-ATYPICAL CYTOLOGY	S.CA19-9-N,CEA-N		DP+S	98 M-UR NP CA
2014	UK	Martin[67]	48	M	AS	U	6.5	T	I	Y-CLOUDY GREEN, CYTOLOGY-NEG	S.CA19-9-N,CEA-N		DP+S	17M -UR MEN
2015	J	Satoh[68]	63	M	AS	MU	6.5	B	I	Y-ATYPICAL CELLS	CA19-9-85.5		DP+S	PO
2016	UK	Arumugam[69]	79	M	P	MU	8.6	T	I	Y-MUCOID MATERIAL. F.CEA-5618,F.AMYLASE-196			DP+S	
2016	J	Hiromitsu[70]	66	M	AS	U	2	H	I	N	S.CA19-9-55, S.DUPAN2-410,S.CEA-N		WPD	
2016	US	Adike[71]	56	M	AS	MU	9.2	T	I	Y-AMORPHOUS	S.CEA-1582,S.AMYLASE-319		DP+S+LND	PO

										MATERIAL, LYMPHOCYT ES.				
2016	SK	Ryo[72]	NA	F	P	MU	6.4	T	I	Y-F.CEA-618,F.CA19-9-N			DP+S	3M
2016	US	Preston[73]	67	M	AS- SKIN	U	1.9	T	P-MRI	N			E	
2016	US	Ruggero[74]	67	M	AS	MU	4.8	H	I	Y			E	
2016	CH	Ho[75]	19	M	P	U	15	T	I	N	CA19-9- 1730		LAP DP	PO-6M
2016	US	Dalal[13]	43	F		U	5	B	P	Y			C	
2016	US	Dalal[13]	84	F		U	4	B	P	Y			C	
2016	US	Dalal[13]	44	F		U	3	T	P	Y			C	
2016	US	Dalal[13]	66	F		U	1.8	T	P	Y			DP	
2016	US	Dalal[13]	65	M		B	2.2	B	P	Y			C	
2016	US	Dalal[13]	48	M		U	2.8	T	P	Y			C	
2016	US	Dalal[13]	65	M		MU	2.9	B	I	Y			DP	
2016	US	Dalal[13]	56	M		U	5	H	P	Y			C	
2016	US	Dalal[13]	50	M		U	3.6	T	P	Y			C	
2016	US	Dalal[13]	37	M		MU	2.5	T	I	Y			DP	
2016	US	Dalal[13]	73	M		U	2.3	T	I	Y-SUSPICIOUS MALIGNANCY			DP	
2016	US	Dalal[13]	54	M		U	2.8	T	I	Y-SUSPICIOUS MALIGNANCY			DP	
2016	US	Dalal[13]	40	M		U	6	T	P	Y			C	
2016	US	Dalal[13]	58	M		U	NA	T	I	Y-SUSPICIOUS MALIGNANCY			DP	
2016	US	Dalal[13]	62	M		U	5.8	B	P	Y			C	
2016	US	Dalal[13]	52	M		U	6	T	P	Y			C	
2016	E-P	Lipinska[76]	46	M	AS	U	NA	B/T	I	NA			E	
2016	E-P	Lipinska[76]	40	M	AS	U	NA	T	I	NA			E	
2016	US	Kendall[77]	64	M	P	U	8	H	I	Y-FLUIS CEA- 320,	S.CEA-18,S.CA19-9- N,S.AMYLASE-N		WPD	

2016	US	Magdeleno[78]	64	M	P,NU, V,DR	MU	28,4	,T	I	Y-P.LEC- INCONCLUSI VE LEC.F.CEA- 2929	S.CA19- 9-N,CEA- N		E,ROBOT E	
2016	UK	Williamson[79]	57	M	AS-CT	MU	4.5	B	I	Y-debris, inflammatory cellsN- mucin,F.CEA- 5500.F.AMYL ASE-N	CA19-9- 36,CEA- N	NO	MP	4M
2016	UK	Williamson[79]	45	M	AP/B	U	6	T	I	Y- debris,F.CEA- 300		NO	DP	PO
2016	UK	Williamson[79]	66	M	AS-CT	U	5	T	I	Y-acellular	S.CEA,S. CA19-9- N	NO	LAP DP+S	PO
2016	UK	Williamson[79]	69	M	AS-CT	MU	4	H-U	P	Y-turbid, keratin debris,CC		NO	C	12m
2017	I	Our	33	F	P	U	5	T	I	Y-INCCA19-9, CEA-N	CEA- N,CA 19- 9-N	NA	DP	NA
2017	USA	Hassan ss[80]	70	M	AS-CT	MU	9	T	I	Y-epithelial debris		NA	DP+S	NA
2017	USA	Samuel s [81]	67	M	P	MU	3.7	T	P	Y-debris, fat droplets	CEA,CA 19-9 -N	NO	LAP DP	NA

GLOSSARY OF ABBREVIATIONS IN TABLE

AS	Asymptomatic
AUS	Australia
B	Body of pancreas
BL	Bilocular
C	Conservative treatment
CAN	Canada
Ch	Chills

CH	China
CT	Computerised Tomography
CYS	Cholecystectomy
DP	Distal pancreatectomy
DP+S	Distal pancreatectomy splenectomy
DR	Diarrhoea
DYS	Dysentry
E	Enucleation
E-CHZ	Europe(Czechoslovakia))
E-F	Europe(France)
E-GER	Europe(Germany)
E-I	Europe(Italy)
E-P	Europe(Poland)
E-SW	Europe(Switzerland)
EUS	Endoultrasound
F	Female
FAT	Fatigue
FE	Fever
I	Intraoperative diagnosis
INC	Increased
J	Jaundice
JP	Japan
Lp DP	Laparoscopic distal pancreatectomy
M	Male ,
MRI	Magnetic Resonance Imaging
MU	Multilocular
N	No
NA	Not available
NIG	Nigeria
NU	Nausea
P	Preoperative diagnosis
PA	Pain
PG	Proximal Gastrectomy
PO	Post operative diagnosis
S	Symptomatic
SK	South Korea

T	Tail of pancreas
TG	Total Gastrectomy
TM	Tumour Marker
Tr	Tiredness
U	Unilocular
UK	United Kingdom
US	United States
V	Vomiting
WL	Weight loss
WPD	Whipple pancreaticoduodenectomy
Y	Yes