Biliary cytology and pancreatic endoscopic ultrasound guided fine needle aspiration cytology

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Workshop cases

The biliary brush cytology in this material is collected form PSC-patients in follow up at the Helsinki University Hospital, Finland. Each workshop case provides a brief case history on the front with cytological papanicolau stained cytospin slides, and when patients have been operated on also the corresponding histological slides. Examine the slides and give your own diagnosis, and only after that you should check on the back of the package what diagnoses were given.

Biliary Brushings

Below are the criteria for the different categories for biliary cytology listed by Siddicui et al in Cancer cytopathology in 2003. In our material the criteria are somewhere between these two categories. We did not use the fifth category (malignant), because we considered that it is not possible to differentiate between infiltrating cancer and high grade dysplasia in brush cytology. If there was clinical suspicion for dysplasia part of the material was sent for flow cytometric DNA analysis. The resuls of the DNA analysis is given in the case histories. I have included some cytologic features of interest in the list of Sedduci et al in red letters and put some in brackets, that I do not consider important.

I want you to pay special attention to specimen adequacy, which was never a problem in our material after the clinician used suction and brushing at the same time. We did not find the squamous metaplasia helpful in dysplasia diagnosis, as metaplasia was often seen in benign processes.

Differential cytologic features of conventional smears versus ThinPrep in biliary cytology (Siddicui et al. Cancer cytopathology 2003)

Cytologic feature	**Conventional smears**	**ThinPrep**
Unsatisfactory		
Cellularity	Acellular	Acellular
Background	Air-drying, some debris	Clean

Negative cytology

Cellularity	Variable, with at least four clusters With 10 cells each	Same as for conventional…
Background	Bile and blood; no inlflammation	Bile and occasionally altered blood
Epithelial cells	Large flat sheets; honeycomb pattern	Small cell aggregates, honeycomp pat..
Cytoplasma	Abundant with large rim around the n.	Scant with thin rim around nucleus
Nucleus	Monomorphous with small n.	Same as for conventional…

Reactive category

Cellularity	Variable, same as negative	Variable as conventional
Bacground	Inflammation present	Inflammation associated with epithel
Epithelial cells	Large flat sheets of overlapping cells Cells, low n/c ratio	Small clusters of overlapping cells with inflammation and low n/c ratio
Cytoplasm	Rare mucin vacuoles	Rare small mucin vacuoles
Nucleus	Slight enlargement, smooth borders	Same as for conventional

Suspicious for malignancy

Cellularity	Variable, at least 2 clusters with 10 cells	Same as for conventional…
	Low n/c-ratio, two distinct types sheets of cells	Same as for conventional but increased relative to conventional
Backround	Variable inflammation, necrosis and mucin	Scant inflammation, necrotic cells or stromal fragments, mucin
Epithelial cells	Cohesive flat sheets or two dimensional clusters of atypical cells	Cohesive smaller papillary fragments with dyshesiveness at the edges
Cytoplasm	Large mucin vacuoles, sqwamous diffe- rentation may be seen	Mucin vacuoles present; intracellular.
Nucleus	Large pleomorphic nuclei with prominent nucleoli, chromatin vesicular	Large hyperchromatic, pleomorphic nuclei with large nucleoli, chromatin

		dense, sometimes vesicular
Malignant		
Cellularity	Relatively lower cell yield, benign sheets and single malignant cells, no ball-like configuration, background inflammation and necrosis	Abundant small three dimensional Clusters, ball like configuration. Single malignant cells, mucin, inflammation and necrosis
Epithelial cells	Highly pleomorphic with significant atypia	Enlarged with significant pleomorphism
Cytoplasm	Intracytoplasmic mucin and squqmous Differentiation	Same as for conventional…
Nucleus	Large, pleomorphic with prominent nucleoli, chromatin open and vesicular	Large hyperchromatic and pleomorphic with prominent nucleoli, chromatin variable

In the Nordic countries primary sclerosing cholangitis (PSC) is the most common cause for liver transplantation. The transplantation must take place before a metastatic disease has developed in the biliary ducts, which is why the patients must be closely survived and we have to learn to find the dysplasia, which precede the infiltrative malignancies.

Brush specimens of pancreatic ducts do not necessarily differ from those of the biliary tree, but mucinous epithelial atypia is more common. Below there is a table which compares the cytologic outcome of biliary versus pancreatic duct brush cytology.

Pancreatic duct cytology (42 cases)/ bile duct cytology (101 cases) collected in 1993-1996 (Vandervoort et al. Gastrointestinal endoscopy 1999)

Distribution of procedure type and underlying disease

	Biliary brush	pancreatic brush	total
Malignant disease			
Pancreatic adenocarcinoma	46	21	67
Cholangiocarcinoma	10	0	10
Mucinous duct ectasia	0	2	2
Metastatic disease	4	0	4
Neuroendocrine tumor	0	1	1
Miscellaneous malignant	4	0	4
Benign disease			
Chronic pancreatitis	11	12	23
Sclerosing cholangitis	14	0	14
Miscellaneous benign	12	6	18
Total	101	42	143

Pancreatic tumors are most often targeted with ultrasound oriented fine needle aspiration, either through the stomach or the jejunum.

The diagnostic criteria are more diverse, and you have to know the differential diagnostic options. Background is different and has a different meaning. Intestinal content and stomach and intestinal epithelium must be recognized.

Pancreatic tumors

Benign	pre-malignant	Malignant
Pseudocysts	Intraductal papillary- and mucinous cyst	Pancreatic ductal adenoca.
Solid pseudopapillary neoplasm	Pancreatic endocreine neoplasm	Adenosquamous ca.
Autoimmune pancreatitis		Foamy gland adenoca.
Serous cystadenoma		Neuroendocrine ca
Retention cysts		Undifferentated ca.
Dermoid cysts		Acinar cell ca.

Cyst fluid should be tested for amylase, 19-9 and CEA

Pseudocysts are mostly diagnosed by the radiologists and are now seldom punctured. Pseudocyst fluid has a high amylase-content.

Thick mucin is diagnostic for the diagnosis of mucinous cyst, even is no cells are found. High CEA-content also supports this diagnosis.

Epithelial neoplasms often need immunohistochemistry for definitive diagnosis. When immunohistochemistry is available from cellblocks in our material, it is included in your case envelopes.

References

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