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Fine needle aspiration cytology of gastric carcinoma

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SUMMARY

Four patients between 58 and 81 years of age undergoing investigation and endoscopic biopsy for gastric carcinoma also were subjected to direct-vision fine needle aspiration cytology of their mucosal lesions which yielded malignant cells. The relevance of this technique is discussed regarding both intrinsic and extrinsic lesions of the gastrointestinal tract.

INTRODUCTION

Percutaneous fine needle aspiration cytology is being used with increasing frequency and accuracy in the investigation of inflammatory and neoplastic lesions in a wide range of tissues including breast, thyroid, salivary gland, lymph nodes, lung, liver and kidney. Both percutaneous and trans-duodenal aspirates are used in pancreatic disease. This paper illustrates the use of aspiration cytology in gastric mucosal lesions where diagnostic yield in endoscopic biopsy and brushing specimens may be as low as 50%, particularly when the lesion is undermining normal mucosa.[1]

PATIENTS AND METHODS

Four patients, aged between 58 and 81 years, underwent oesophago-gastro-duodenoscopy with multiple endoscopic biopsies. The biopsy fragments were placed in 10% formalin and sent for routine processing through to paraffin sections with haematoxylin and eosin and cresyl-violet staining. The gastric mucosal aspirates were obtained using a fine bore flexible needle (Disposable Varices Injection Needle, DV1-25, Wilson-Cook Medical Inc., Winston-Salem USA) passed via the biopsy channel of a standard gastroscope. Multiple punctures of each suspicious lesion were taken. The aspirate was flushed through into a container of normal saline and immediately transported to the Cytopathology Laboratory. Four cytospins were prepared from each sample and stained with haematoxylin and eosin, Papanicolaou and Giemsa preparations.

CASE 1

A 75 year old male presented with dysphagia and weight loss. Gastroscopy showed severe gastritis with clinical suspicion of possible linitis plastica. No ulceration or raised mucosal lesion was seen. Eight endoscopic biopsy fragments were submitted. Six of these showed chronic gastritis and focal small intestinal metaplasia. In two there was diffuse gastric carcinoma of signet-ring cell type. Of the four cytospin preparations one contained malignant signet-ring cells (figure 1).

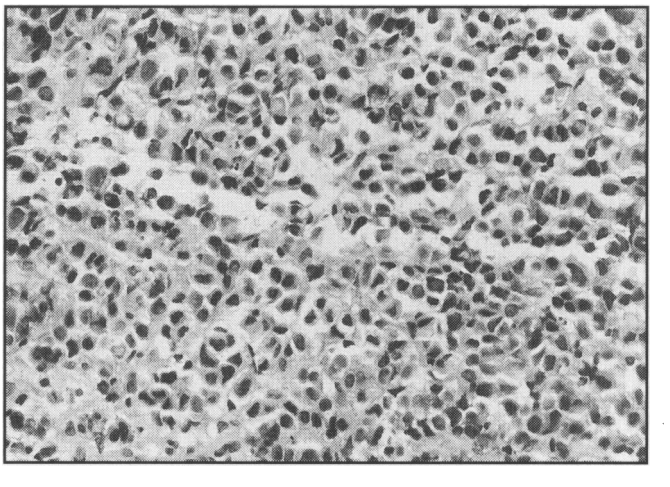

Fig 1. (a) Case 1 – biopsy histology showing diffuse type gastric adenocarcinoma.

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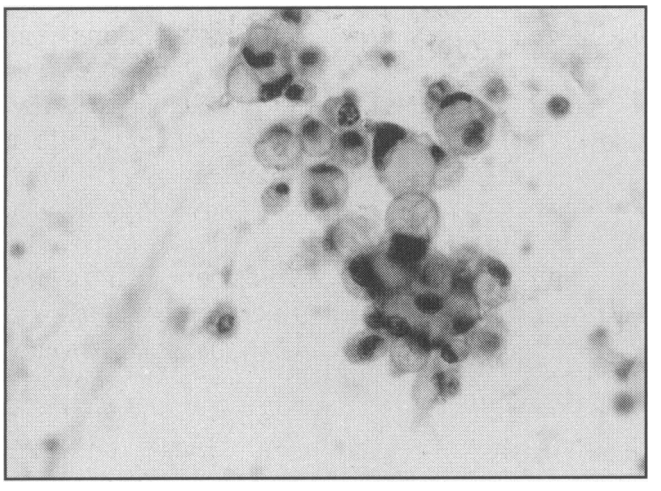

Fig 1. (b) Case 1 – aspiration cytology showing malignant signet-ring cells.

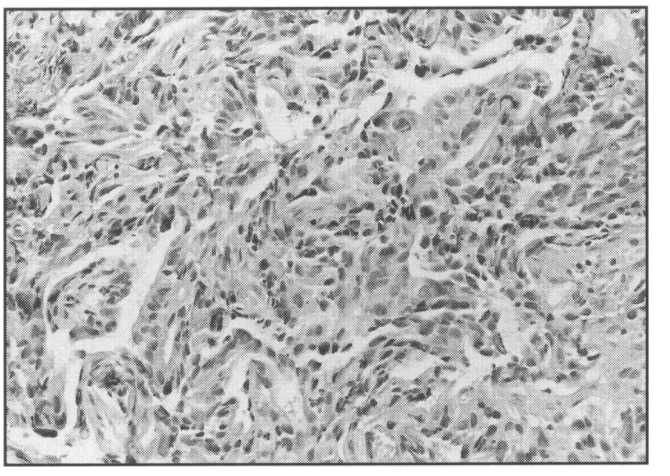

Fig 2. (a) Case 2 – biopsy histology showing poorly differentiated intestinal-type gastric adenocarcinoma.

CASE 2

A 73 year old male presented with dysphagia. Gastroscopy showed a large ulcerated tumour at the gastric cardia. Seven endoscopic biopsies were submitted, four of which, contained ulcerated, severely dysplastic glands suggesting that the sample came from the surface of an adenocarcinoma. The cytospin preparations contained malignant cells from a poorly differentiated carcinoma (figure 2).

CASE 3

An 81 year old female presented with dyspepsia. Gastroscopy showed a 4 mm diameter raised pre-pyloric lesion. There was poor distention of the gastric body and a clinical suspicion of carcinoma. Two biopsy fragments were submitted showing congested, reactive gastric mucosa. Along an edge in one of these was a number of moderately dysplastic glands. The cytospin preparations contained benign columnar epithelial cells and a small number of atypical cells. Repeat endoscopic biopsy showed intramucosal adenocarcinoma.

CASE 4

A 58 year old male presented with weight loss, dyspepsia and evidence of bone metastases. Gastroscopy showed a rigid stomach and suspicion of a lesion at the oesophago-gastric junction. Four endoscopic biopsy fragments were submitted, two of which contained diffuse gastric carcinoma of signet-ring cell type. The cytospin preparations also contained poorly differentiated carcinoma cells.

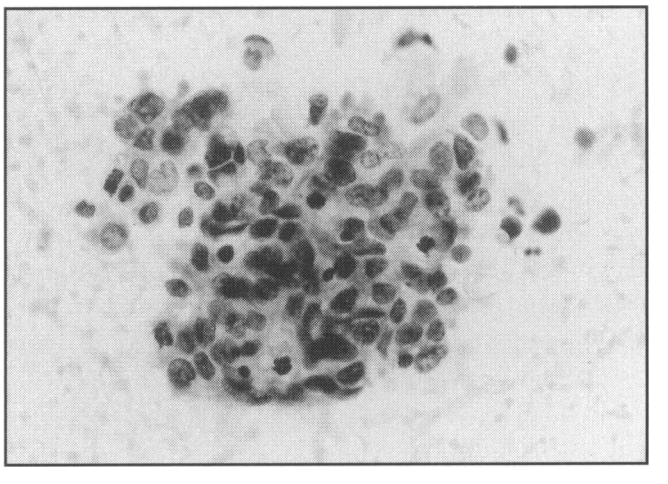

Fig 2. (b) Case 2 – aspiration cytology showing malignant cells from a carcinoma.

DISCUSSION

Standard practice for maximal diagnostic yield is to submit multiple biopsies both from around the rim and base of an ulcerated gastric lesion.[2] Despite this, positive diagnostic rates can be low especially when the lesion is undermining normal mucosa.[1] This is particularly relevant to linitis plastica, where the carcinoma shows predominantly a submucosal pattern of spread, submucosal/mural lesions such as leiomyomatous tumours and extra-mural extrinsic compression. A number of studies have considered the comparative diagnostic yield of such lesions using endoscopic biopsy, brush cytology and fine needle aspiration cytology. Iishi *et al* [3] found a biopsy yield of 83.1% in 65 patients increased to 87.7% when combined with brush cytology. Positive

biopsies were generally obtained from lesions with an eroded or ulcerated surface rather than an intact mucosa. In addition fine needle aspiration cytology confirmed the diagnosis in 11 of their 65 patients and was positive in four patients in whom routine histology and cytology were negative. Ingoldby *et al* [4] had two similar cases positive only on aspiration cytology and noted that the technique was particularly useful in tumours situated deep to normal mucosa or necrotic slough. Tao and Davidson[5] illustrated the cytological features of 10 gastric leiomyomas and 41 leiomyosarcomas – lesions which are also amenable to tissue diagnosis using an endoscopic ultrasonographically-guided guillotine needle biopsy which yields a sample approximately 8 mm long x 1.1 - 2.1 mm diameter.[6] However, a note of caution should be sounded as the behaviour of leiomyomatous or gastrointestinal stromal tumours can be difficult to predict morphologically and a combination of various parameters, eg size, necrosis, mitoses, margin, cellularity and cytological atypia should be taken into account. Kochar *et al* [7] in a series of 46 gastro-oesophageal malignancies had positive yields of 88.8%, 80.4% and 89.1% with forceps biopsy, brush cytology and needle aspiration cytology respectively. The combination of biopsy and brush cytology increased this to 93.5% whereas all three modalities gave a 100% result. Not surprisingly, as in other sites such as bronchoscopic biopsy and brush cytology, diagnostic yield increases with the amount of material submitted and the number of techniques used. As with any technique false negative and false positive sampling can occur,[6,8] emphasising that the techniques are complementary and should be looked at in combination rather than isolation. Fine needle aspiration cytology has also been used both to exclude and diagnose lymphoma in thickened gastric folds[8,9] and even in a case of CMV infection.[8]

Fine needle aspiration cytology has also increased the diagnostic yield in oesophageal and colonic lesions.[10] Zargar *et al*[11] in a series of 265 oesophageal, gastric and colorectal malignancies found diagnostic accuracies of 87.2% (biopsy), 84.9% (brush cytology) and 94% (fine needle aspiration) which were related to the tumour growth pattern. Fine needle aspiration cytology was statistically significantly better in diagnosing submucosal, deeply infiltrative and ulceronecrotic malignancies. There was a non-significant trend for biopsy to be better in polypoid lesions. The cumulative accuracy of the three modalities was 98.5% versus 90.9% for biopsy and brush cytology alone. Aspiration cytology was also diagnostic in 21 out of 24 lesions that were negative on brush cytology and biopsy. Aspiration cytology may be of use in extrinsic compression of the gastrointestinal tract, examples being gastric and caecal secondaries in the Pouch of Douglas and lung carcinoma causing an extrinsic occlusion of the mid oesophagus.[12] Faced with a potentially malignant submucosal or extrinsic lesion yielding negative conventional forceps biopsy and brush cytology results a further option is the use of endoscopic ultrasonography. It can be of help in characterising and staging various lesions, eg leiomyoma – importantly it can be coupled with directed fine needle aspiration cytology to obtain a definitive tissue diagnosis.[9,13,14] Endoscopic ultrasonography is not currently available in Northern Ireland. Diagnoses obtained on transoesophago-gastric aspiration included ectopic thyroid tissue, lung carcinoma, secondary breast carcinoma, sarcoidosis and tuberculosis. The technique has also been of use for adrenal adenomas,[14] retro rectal tumours,[9] and pelvic recurrence of rectal cancer.[15]

The technique requires no specialist apparatus; the flexible needle is widely used for endoscopic sclerotherapy or haemostasis. The use of this technique should be brought to the attention of clinicians and pathologists as a means of supplementing routine endoscopic biopsy and brush cytology investigations.

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