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Mott Cell (Russell Bodies) Barrett's Oesophagitis

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Abstract. *The first case of Barrett's oesophagus with chronic inflammation having predominantly (>50%) Mott cells, i.e. plasma cells with stored immunoglobulins, known as Russell bodies, is reported. Biopsies from two oesophagoscopies revealed similar changes, suggesting that the predominance of Mott cells is not a fortuitous event but a more long-lasting microscopic process. Periodic acid-Schiff (PAS) stain ruled out Candida albicans and immunostains, plasma cell neoplasia. Mott cells were not present in biopsies from the gastric mucosa or the urinary bladder, suggesting that this phenomenon was not widespread but localized to the Barrett's mucosa. The retention of immunoglobulins (Russell bodies) suggests that the mechanism of protein transport in those plasma cells is incompetent, and that the proteins are neither degraded nor secreted, but remain stored in dilated cisternae. Increased awareness of the existence of this subgroup of Barrett's oesophagitis may result in similar cases being reported in the future.*

In 1890, Russell (1) detected cytoplasmic globular inclusions assumed to be fungi implicated in the aetiology of cancer. Since then several workers have investigated the nature of those cells both in lymphatic tissues and in tumours (2-8). Their results have shown that the inclusions are immunoglobulins stored in the endoplasmic reticulum of plasma cells. Such plasma cells are called Mott cells (4, 9) and their round eosinophilic intra-cytoplasmatic inclusions, Russell bodies. Mott cells may also be found in plasma cell tumours of the stomach (2), in B-cell lymphomas (10) and, occasionally, in areas with chronic inflammation of the gastric and colorectal mucosa (8, 9). Extracellular globules indistinguishable from Russell bodies having monoclonal immunoglobulins were recorded in the bone marrow of a patient harbouring a gastric carcinoma (6).

In 1998, Tazawa and Tsutsumi (11) reported the accumulation of plasma cells containing Russell bodies in the gastric mucosa in association with *Helicobacter pylori* infection. That case was called Russell body gastritis. In 2004, Erbersdobler, Petri and Lock (12) described the second case of Russell body gastritis.

Recently, while reading biopsies from the oesophagus, we noticed in a patient with Barrett's oesophagitis the presence of a high number of plasma cells with Russell bodies. This unusual, not previously described, inflammatory-immunological reaction in the Barrett's mucosa has received the working name Mott cell Barrett's oesophagitis

Case Report

An 88-year-old male was treated for some years for GOR (gastric oesophageal reflux) with oesophagitis. In 2004, 2 oesophagoscopies 3 months apart revealed a 20-cm-long Barrett's mucosa. Biopsies were taken on both occasions from 5, 10 and 15 cm proximal to the lower esophageal sphincter (LES), as well as from the stomach (body and antrum). Sections were stained with haematoxylin and eosin (H&E) and Periodic acid-Schiff (PAS).

All biopsies from the oesophagus showed columnar lined mucosa with chronic inflammation. In addition, glands with intestinal metaplasia were found in biopsies taken 5 and 10 cm proximal to the LES. Admixed with a high number of Mott cells (Figure 1), neutrophilic and eosinophilc granulocytes and round inflammatory cells were present. The PAS stain showed no *Candida albicans*.

Differential cell counting/high-power field (400x) was done in the mucosa in 5 consecutive fields, using a 40x objective with a 0.95 aperture. With that setting (Labophot-2, Nikon microscope) the field (diameter 490 μm) measured 188,574.5 μm^2. The mean counting revealed that 58 (range 52-28) were Mott cells, 12 (range 8-16) were lymphocytes, 10 (range 6-14) plasma cells, 6 (range 4-10) eosinophilic granulocytes and 3 (range 1-5) neutrophilic granulocytes. In

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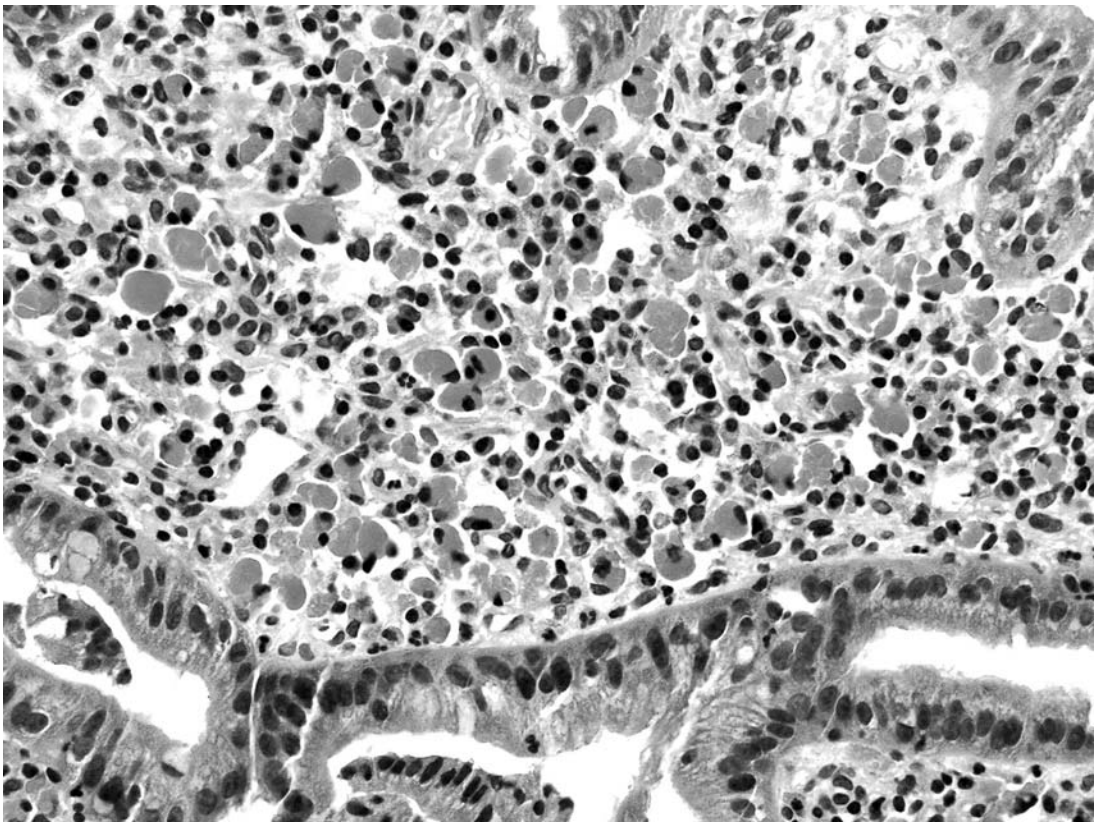

Figure 1. *Detail of Barrett's oesophagus showing in the lamina propria a high number of Mott cells containing Russell bodies, admixed with lymphocyte, plasma cells and granulocytes (H&E, transmitted light, original magnification 40x).*

one of the biopsies, taken 10 cm from the LES, low-grade dysplasia was found.

When the same H&E-stained sections from the oesophagus were observed with indirect light fluorescent (ILF) from a fluorescent microscope (Axioscop, Zeiss), the eosinophilic Russell globules turned autofluorescent (Figure 2). Sections from the oesophagus were also stained with CD 38, CD 138, *kappa, lambda*, Giemsa stain, Alcian Blue pH 2.5 and PAS: Russell bodies were strongly positive for PAS stain, CD 38 and CD 138. Mott cells stained positive for *kappa* and *lambda*.

Biopsies from the gastric body and antrum, taken during the same endoscopic examinations, showed no signs of inflammation. H&E-stained sections from gastric biopsies examined with conventional transmitted light and with ILF showed no Mott cells or autofluorescent cells, respectively.

The patient had, in addition, chronic cystitis. Biopsies from the urinary bladder showed chronic inflammation. H&E-stained sections from the urinary bladder examined with transmitted light and with ILF showed no Mott cells or autofluorescent cells, respectively.

The Ethical Committee of the Department approved this study.

Discussion

A case of Barrett's oesophagus with chronic inflammation, having predominantly (>50%) Mott cells with stored polyclonal Russell bodies, is presented. Oesophageal biopsies taken 3 months previously showed an analogous infiltration of Mott cells in the Barrett's mucosa with active chronic inflammation, suggesting that the predominance of Mott cells may not be a fortuitous event but part of a more long-lasting microscopic process.

According to Kopito and Sitia (7), all cells are equipped with a protelytic apparatus that eliminates misfolded and damaged proteins. The 26S proteasome, the principal engine of cytoplasmic proteolysis, requires unfolded substrates but is ineffective at degrading aggregated proteins. When the production of aggregated proteins exceeds the cell capacity to eliminate them, a phenomenon of cellular indigestion of the endoplasmic reticulum (ER) occurs. The condensation of those immunoglobulins

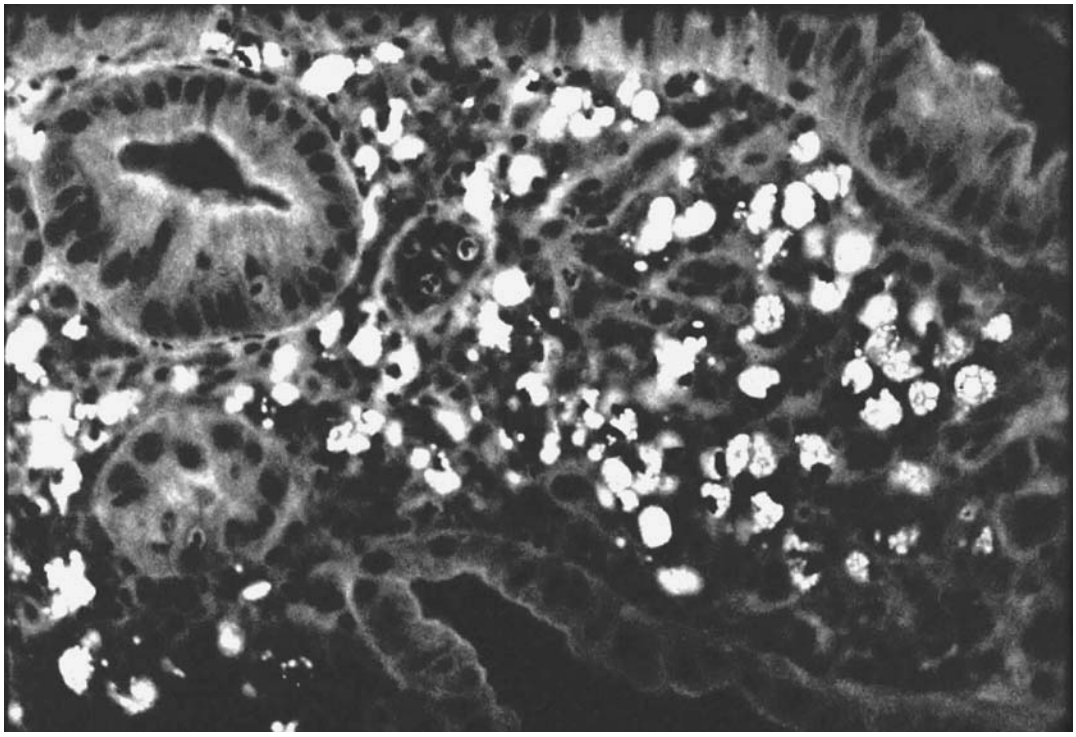

Figure 2. *Detail of Barrett's oesophagus showing in the lamina propria a high number of autofluorescent Russell bodies contained in Mott cells, admixed with lymphocyte, plasma cells and granulocytes (H&E, indirect light fluorescent, original magnification 40x).*

suggests that the mechanism of protein transport in the ER is incompetent and that the proteins are neither degraded nor secreted and, thus, remain stored in dilated cisternae (7). The reason for the accumulation of "indigested" plasma cells as well as the fate of Mott cells regarding lifespan are at present unknown.

In 1983, Ohtsuki *et al.* (8) reported a case of plasma cell granuloma of the stomach containing many plasma cells with polyclonal Russell bodies and inflammatory cells. Although not identified as such, their case is probably the first case of plasma cell gastritis in the literature. Seven years ago, Tazawa and Tsutsumi (11) reported a similar case that had, in addition to polyclonal Russell bodies, inflammatory cells. That case was named for the first time "Russell body gastritis". Subsequently, Erbersdobler, Petri and Lock (12) found a circumscribed mucosal swelling in the stomach composed of a homogeneous tissue containing Mott cells with polyclonal Russell bodies. Although these authors named that lesion Russell body gastritis, no inflammatory cells were found in their case.

In our case, the detection of Russell bodies was significantly facilitated by the observation of H&E-stained sections with ILF, the autofluorescence of Russell body-immunoglobulins contrasting against the non-fluorescent, dark background (Figure 2). "Regular" plasma cells (*i.e.* without Russell bodies) are not autofluorescent. This was confirmed in 10 consecutive cases of chronic Barrett's oesophagitis, in 10 consecutive cases of chronic gastritis and in 10 consecutive cases of inflammatory bowel disease of the colon. In 2 of the latter 10 cases, however, occasional plasma cells with autofluorescent Russell bodies were found. Tazawa and Tsutsumi (11) previously pointed out the occurrence of occasional plasma cells with Russell bodies in cases with chronic inflammation.

It should be mentioned that the method of observing H&E-stained sections with ILF is being used in this Department as a complement in the diagnosis of a variety of gastrointestinal diseases such as duodenal gastric metaplasia (13), Paneth cell metaplasia and adenoma (14, /15), collagenous colitis (16) and α-1 antrypsin deficiency in liver biopsies (in preparation).

In conclusion, the first case of Mott cell Barrett's oesophagitis is presented. The absence of Mott cells in the gastric mucosa and in the urinary bladder of this patient suggests that this apparently long-lasting phenomenon was not widespread but localized to the Barrett's mucosa. Plasma cell neoplasia was ruled out by immunostains.

Increased awareness of the existence of this subgroup of Barrett's oesophagitis may result in similar cases being reported in the future.

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