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Case Report

Renal Malakoplakia

Report of a Case with Giant Michaelis-Gutmann Bodies

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Summary. We report an unusual case of renal malakoplakia appearing as a solitary tumour with spread beyond the confines of the kidney, affecting adjoining organs. The Michaelis-Gutmann bodies were extraordinary large (>100 μ) and contained inconspicuous amounts of lime-salts. Their ultrastructural features, however, were identical with those previously described for Michaelis-Gutmann bodies.

Key words: Renal malakoplakia – Tumour-like appearance – Giant Michaelis-Gutmann bodies – Light- and electron microscopic observations

Introduction

An increasing number of reports on Malakoplakia (M.) have gradually outlined the general clinical and pathological features and have established the more distinct microscopic characteristics. Thus, according to the present literature, M. usually presents as a plaque-like or nodular process, which may be locally expansive but rarely exceeds the confines of the organ(s) involved. Among the histological features particular interest is directed to the so-called Michaelis-Gutmann bodies, since they are considered to be the diagnostic hallmark of the lesion (Melicow 1957). These bodies, the ultrastructure of which is well established (Lambird 1970), have invariably been reported as being from 10 to 30 μ in size and are further characterized by the presence of lime-salts (McDonald 1913).

The aim of this report is to add to the range of morphological findings in M. by the description of a case of renal malakoplakia, which is unusual both macroscopically, in the extent of involvement, and in the light-microscopic appearance of the bodies.

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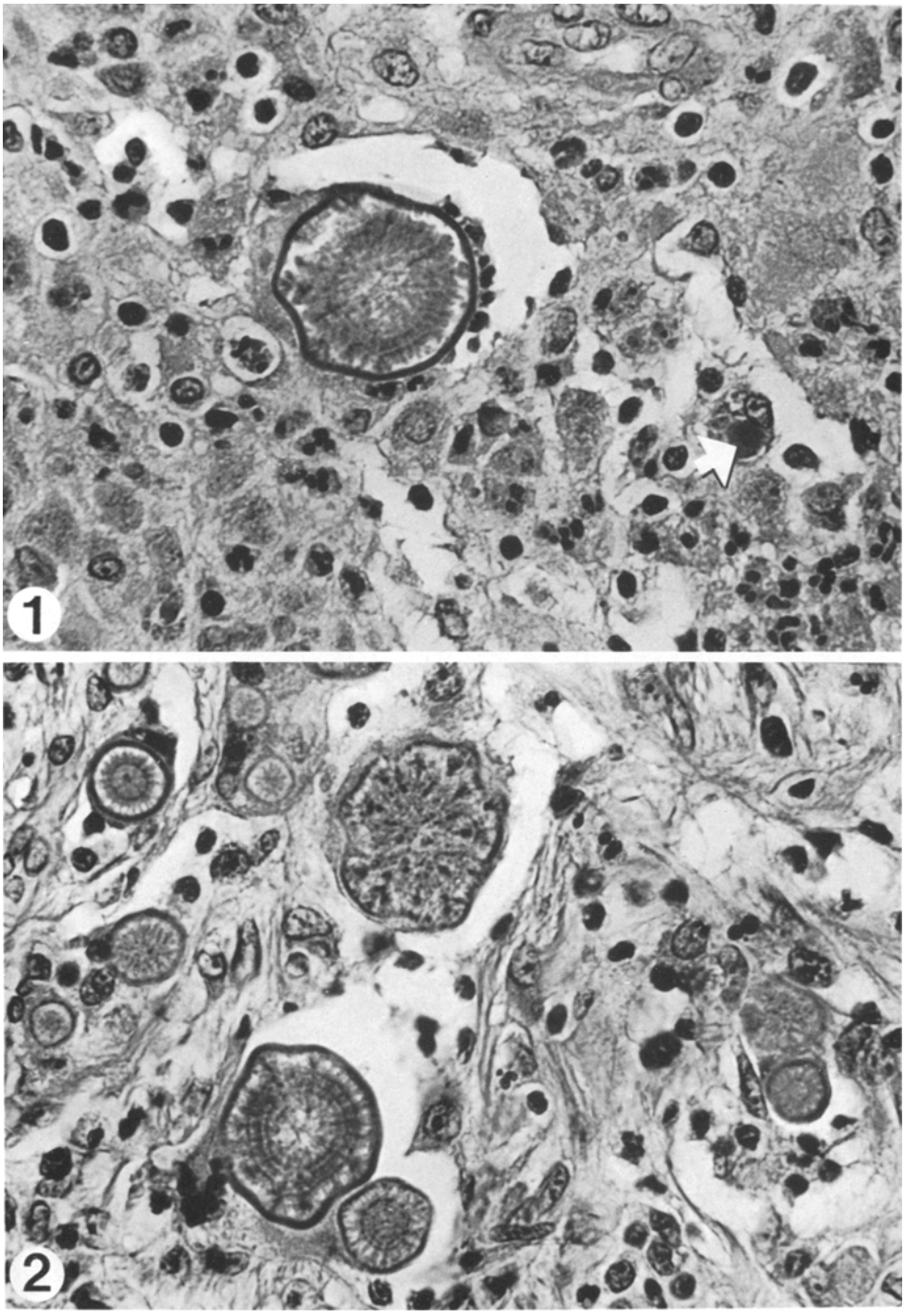
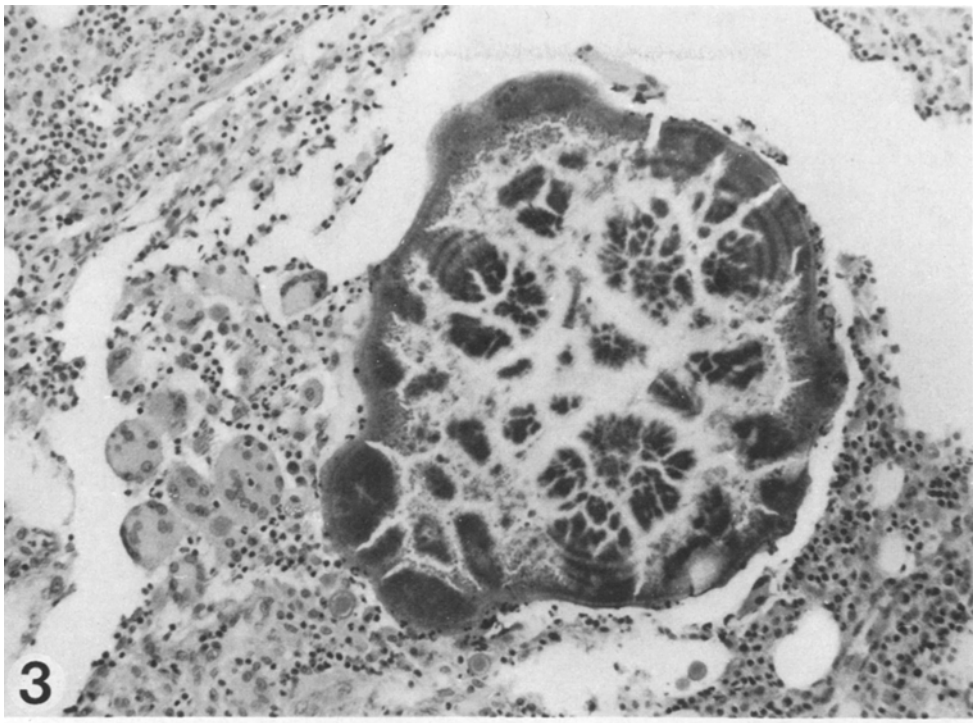


Fig. 1. Typically laminated giant Michaelis-Gutmann body surrounded by macrophages containing smaller homogenous bodies (arrow) (haematoxylin-eosin $\times 300$)

Fig. 2. Photomicrograph illustrating the great variation in size and structure of the Michaelis-Gutmann bodies (haematoxylin-eosin $\times 300$)



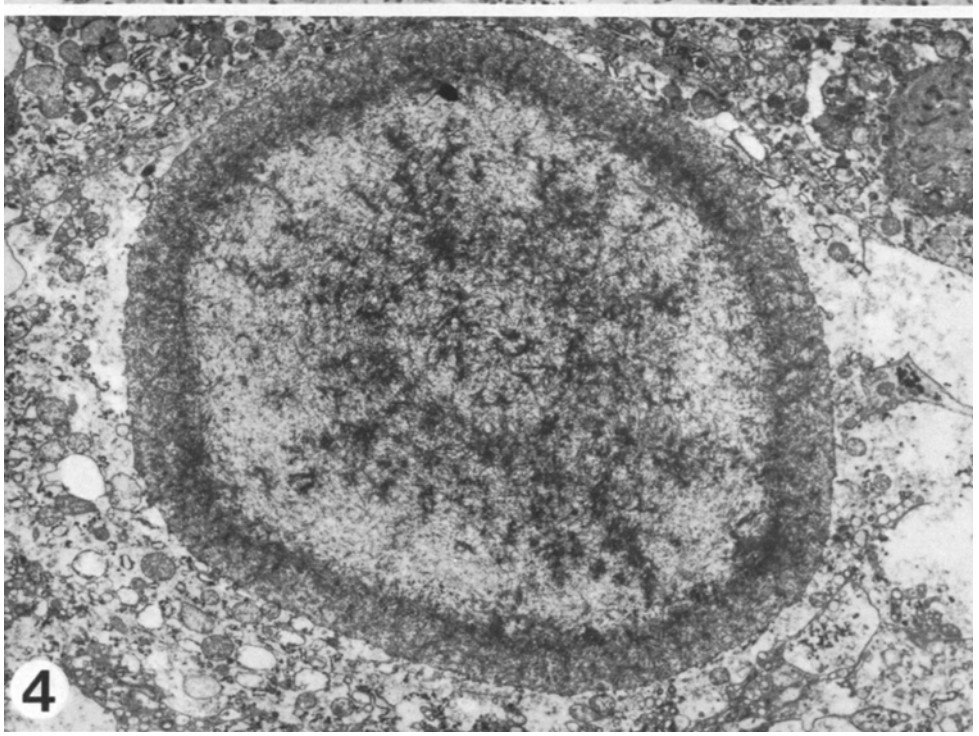


Fig. 3. Confluent, partly laminated bodies associated with a foreign-body reaction (haematoxylin-eosin $\times 125$)

Fig. 4. Electron micrograph showing part of macrophage with a characteristic Michaelis-Gutmann body containing needleshaped hydroxy-apatite crystals ($\times 12{,}000$)

Case Report

A fifty-six year old woman was admitted to hospital because of left flank pain and fever. By physical examination she presented a tender mass in the left side of the abdomen but otherwise no signs of disease. There was pyuria with significant growth of *E. coli* on urine culture. An excretory urogram and a renal arteriography indicated a local expansive process in the left kidney, thought to represent a tumour. Nephrectomy and hemicolectomy were performed.

Pathology

The surgical specimen showed a tumor-like mass measuring 10×10 cm, which was situated in the cortico-medullary zone of the kidney. The mass was centrally cystic-necrotic but otherwise consisted of firm whitish tissue which spread through the renal capsule into the perirenal tissue and the external wall of the descending colon. Kidney tissue not involved by this process appeared normal and there was no obvious obstruction and no signs of inflammation or plaqueformation in the pelvis or ureter.

Specimens for light-microscopy included sections of tissue fixed for 3 days with 4% buffered formaldehyde, embedded in paraffin and stained with routine stains, periodic-acid-Schiff (PAS), Perls' Prussian blue and the von Kossa method (including positive controls). Specimens further processed for electron-microscopy were fixed with 2% cacodylate-buffered glutaraldehyde, post-fixed with 1% osmium tetroxide and embedded in Epon.

Light-Microscopy. The overall microscopic picture was that of confluent nodules of granulation tissue which were arranged concentrically around a cystic abscess-like cavity. In all parts of the granulation tissue large PAS-positive macrophages were the predominant cellular constituent. In some areas, and in particular along the central cavity, there was an obvious layering of the granulation tissue with increasing fibrous organization towards the periphery and trapping of smaller lipofuscin-laden macrophages. Intra- and extracellular bodies appeared in large amounts, however, with considerable individual variation in respect to both size and structure. Thus the bodies presented a spectrum from approximately 10 to well over 100 μ at the extremes (Fig. 1). Various stages of structural organization could be observed from almost homogenous masses to giant bodies with a distinctly laminated structure (Fig. 2). Focally the bodies coalesced into larger aggregates giving rise to a foreign-body reaction (Fig. 3). Occasional bodies were surrounded by a rim of leucocytes. Regardless of the stage of structural organization or size, none of the bodies showed a positive stain for calcium or iron.

Electron-Microscopy. The predominant constituent of the macrophages were phagolysosomes containing mostly unidentifiable cellular debris. Occasional bacteria-like structures were observed. Focally fragments of myelin-like material in connection with other cellular degradation products coalesced into larger aggregates with or without a distinct membranous envelopment. From this point of structural organization a gradual development could be followed from one cell to another towards the definite, typically laminated Michaelis-Gutmann body (Fig. 4). In all the bodies observed the degree of mineralization was inconspicuous.

Discussion

In the kidney M. most often represents part of a more widely disseminated process involving the renal pelvis, the ureter and the urinary bladder (McDonald 1913; Gibson 1955; Bowers 1971; Cadnapaphornchai 1978). Although the involvement of the kidney may be quite extensive, propagation to extrarenal sites is extraordinary and with one exception (Gupta 1972) has been described only in connection with retroperitoneal or perinephric abscess formation (Scott 1958; Lambird 1970). Macroscopic presentation like our case, with a tumour-like process in the kidney and secondary involvement of perirenal structures and

adjoining organs is unique. It certainly modifies the concept of M. as "a self-limited process" (Melicow 1957) and further, places M. in the category of lesions, which may imitate renal neoplasms, like tumefactive xanthogranulomatous pyelonephritis (Selzer 1957). Apart from a superficial and in part, a histological resemblance to this variety of xanthogranulomatous pyelonephritis, the topography of the lesion described and the absence of any obvious urinary tract obstruction is like the observations made in relation to tumefactive xanthogranulomatous pyelonephritis in contrast to xanthogranulomatous pyelonephritis in general (Møller 1980). This lends some support to the assumption of a pathogenic relationship between the two processes occurring as masses (Lambird 1970) and may indicate a common base of origin. The partly cystic appearance of the present lesion in addition to previous personal observations of cystic changes in relation to tumefactive xanthogranulomatous pyelonephritis and the occurrence of typical malakoplakia cells in a kidney cyst indicate that this common base of origin may be a cystic cavity. The reason for this is not known but might be due to retention of cellular break-down material.

Any explanation as to the presence and formation of giant Michaelis-Gutmann bodies in the present case remains purely speculative. No obvious light- or electronmicroscopic differences were noticed between the bodies of ordinary size and their giant counterparts. Thus in both cases the electron-microscopic findings corresponded with previous observations. Apart from mineralization this also applied to the different developmental stages of Michaelis-Gutmann body formation (An 1974). Theoretically an unlimited increase in size might well be expected, provided the underlying biological mechanism is still active. However, a factor limiting persistent growth of the bodies might be calcification itself, which could further explain the low degree of mineralization as evidenced both by the negative von Kossa stain and the ultrastructural appearance of the bodies. Finally it should be mentioned that ultrastructural features, basically identical with those of the Michaelis Gutmann bodies have been observed in psammoma bodies (Ferenczy 1977) and in subunits of urinary calculi (Spector 1978). These further aspects of calcospherule formation together with the fact that Michaelis-Gutmann bodies may occur unassociated with other histological signs of M. (Bunting 1951) make the non-specific character of this phenomenon obvious and probably reduce the problem of giant-body formation to a matter of biological variation.

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