ULTRASONIC FINDINGS IN ANALGESIC NEPHROPATHY

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Summary

Thirty-four patients with analgesic nephropathy (AN) were investigated by real-time ultrasonography. In 11 of 14 dialysis patients and in 16 of 20 patients with renal insufficiency calcified renal papillae were documented surrounding the internal echo in a typical garland pattern. Incomplete garland pattern of papillary calcifications or development of hydronephrosis occurred in patients with a history of renal colic due to detachment of necrotic papillae. Moreover, AN was assumed in 10 patients with renal insufficiency of unknown origin after detection of typical ultrasonic signs of AN and confirmed by a hitherto unknown history of analgesic abuse.

Introduction

Analgesic nephropathy represents a common cause of renal insufficiency in certain geographic areas [1–3]. Diagnosis is complicated because analgesic abuse is often not admitted, thus being unknown to the physicians in about 50 per cent of the cases [3]. In the present study we investigated patients with an established diagnosis of analgesic nephropathy by ultrasonography in order to describe the scanning pattern of the kidneys. In a second group of patients with renal insufficiency of unknown origin we tested whether ultrasonography was able to identify analgesic nephropathy.

Methods

Thirty-four patients with analgesic nephropathy, 14 on chronic intermittent haemodialysis and 20 patients with renal insufficiency (serum creatinine 1.5–9.5 mg/100 ml) were investigated by ultrasonography. The average phenacetin ingestion amounted to 17.5 kg and 8.5 kg respectively. A second group of patients consisted of all in- and outpatients with renal insufficiency of unknown origin.
In this group ultrasonography was applied as an early step in diagnostic procedure.

Commercially available real-time sector scanners with 3.5 MHz transducers were used.

Results

Calcifications of the renal papillae were documented in 11 of 14 dialysis patients and in 16 of 20 patients with renal insufficiency due to analgesic nephropathy. The calcification always surrounded the internal echo in a typical garland pattern (Figure 1). Calcification began at the tip of the papilla with still perceptible low sonodense pattern of unchanged renal pyramids (Figures 1–3). In dialysis patients the papillary calcifications sometimes involved whole renal pyramids (Figure 4). Thirteen patients with a history of renal colic showed an incomplete garland pattern of papillary calcifications due to detachment of necrotic papillae (Figure 3). This incomplete garland pattern of calcification also occurred in six cases with only patchy calcification of the papillae and no history of renal colic. In two cases combination of garland calcification

![Figure 1. Typical garland pattern of papillary calcifications in analgesic nephropathy, with only a few calcifications showing distal shadowing in this section plane](image)
Figure 2. Normal human kidney showing low level echoes corresponding to renal pyramids forming a typical garland pattern around the internal echo.

Figure 3. Incomplete garland pattern of papillary calcification in a patient with analgesic nephropathy and a history of renal colic (creatinine 5mg/100ml). The calcification starts at the tip of the papillae with less echogenic renal pyramids still perceptible.
with hydronephrosis occurred as a consequence of ureteric obstruction by a detached papilla. Reduction of kidney size and shrunken cortex was detected in severe cases of renal insufficiency and in patients treated by chronic intermittent haemodialysis. In patients with moderate renal insufficiency, however, kidneys showed a normal size for many years with only a slight thinning of the cortex. In dialysis patients a similar echogenicity between cortex and internal echo of the shrunken kidney was usually documented.

In the second group of patients with renal insufficiency of unknown origin scanning revealed the typical ultrasonic signs of analgesic nephropathy in 10 cases, three of them complicated by hydronephrosis. The tentative diagnosis was confirmed by obtaining a hitherto unknown history of analgesic abuse. Three other patients showing similar ultrasonic findings suffered from nephrocalcinosis due to primary hyperparathyroidism (1) and sarcoidosis with hypercalciuria (2) (Figure 5).

Discussion

Pathologists describe early, intermittent and advanced changes in analgesic nephropathy with papillary and medullary alterations appearing first [4,5]. The advanced changes are characterised by total necrosis of the inner medulla.
and papillae, as well as cortical scarring. Small fragments of these necrotic papillae may crumble away or entire papillae may be detached. However, many papillae remain in situ and calcify.

Radiological changes in analgesic nephropathy have been well described by Lindvall [6]. Our present study indicates that ultrasonography may also be able to document typical signs in analgesic nephropathy. In about 80 per cent of patients with a known history of analgesic abuse, a complete or incomplete garland pattern of papillary or even pyramidal calcifications was documented (Figures 1, 3, 4). Some other diseases may show similar ultrasonic signs, such as nephrocalcinosis (Figure 5), which favours medullary calcium deposition as well as formation of renal stones. In contrast calcification in analgesic nephropathy starts at the tip of the papilla whereas pyramidal calcification takes place only in severe renal insufficiency (Figures 3 and 4). In renal calculi, which are often solitary, a typical garland pattern is uncommon. Diabetes mellitus may also be associated with renal papillary necrosis and consecutive calcification. However, in 21 patients with chronic renal insufficiency due to diabetic nephropathy, we were not able to demonstrate any papillary calcification. Diseases known to be associated with renal papillary necrosis or calcification such as medullary sponge kidney, sickle cell disease or chronic liver disease [7,8] may possibly show similar ultrasonic findings. After exclusion of these diseases, we believe the scanning pattern to be typical for analgesic nephropathy.

The possibility of establishing a tentative diagnosis by non-invasive and
routinely performed ultrasonography seems to be of great importance as physicians may be able to detect a hitherto unknown analgesic abuse by observing typical ultrasonic findings as in 10 of our own patients. In patients with moderate renal insufficiency, the long term prognosis is good provided that total abstinence from analgesics is achieved. In dialysis patients, the basic diagnosis of end-stage renal failure is unknown in about 10 per cent of the cases [9]. In some of these patients, typical ultrasonic signs may possibly detect an unknown abuse of analgesic mixtures. Although kidney function has already been damaged irreversibly in this group of patients, knowledge of analgesic abuse is important because of the increased risk of developing uroepithelial carcinoma in these patients [10]. We believe that ultrasonography might be helpful in establishing the sometimes difficult diagnosis of analgesic nephropathy.

References

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