Case Report

Received: April 25, 1995

Accepted: June 19, 1995

Urol Int 1996;56:112-113

Three-Dimensional Imaging Using Spiral Computerized Tomography prior to Tumor Enucleation in a Patient with a Solitary Kidney

S.		Madjar
B.		Moskovitz
S.		Halachmi
O.		Nativ

Department of Urology, Bnai Zion Medical Center, Technion, Institute of Technology, Haifa, Israel

Key Words

Renal cell carcinoma
Solitary kidney
Three-dimensional imaging
Computerized tomography

Abstract

The authors present a case of renal cell carcinoma in a man with a solitary kidney. Three-dimensional computerized tomography instead of selective renal angiography was used preoperatively as a noninvasive technique for visualization of the renal tumor and renal vascularization.

Ofer Nativ, MD, Urology Department, Bnai Zion Medical Center, Haifa 31048 (Israel)

Introduction

Renal parenchymal-sparing surgery is the treatment of choice when a localized renal cell carcinoma (RCC) is present bilaterally or in a functionally or anatomically solitary kidney. These patients were studied preoperatively with selective renal angiography in order to visualize the renal tumor, vasculature and collecting system enabling better planning of the operation. Herein, we present a patient with RCC in a solitary kidney in whom preoperative evaluation was conducted by noninvasive three-dimensional computerized tomography.

Case Report

A 74-year-old asymptomatic man, 5 years after right radical nephrectomy for RCC, underwent routine follow-up examination.

Abdominal ultrasonography and computerized tomography revealed multiple cysts and a lower pole solid mass, 8 cm in diameter, occupying the left kidney (fig. 1).

Since the patient's renal function tests were impaired (serum BUN and creatinine levels were 54 mg/dl and 2.8 mg/dl, respectively) and selective renal angiography would further decrease his renal function, we elected to perform three-dimensional spiral computerized tomography, which clearly showed the left renal artery and its

lower pole branch lying parallel and medial to the tumoral mass (fig. 2). Using this information, tumor enucleation was performed with minimal damage to the normal parenchyma. Renal function did not change significantly (postoperative serum creatinine level was 3.6 mg/dl).

Discussion

Renal parenchymal-sparing surgery for RCC (tumor enucleation or partial nephrectomy) is indicated in patients with bilateral synchronous or asynchronous RCC, those with a functionally or anatomically solitary kidney, and individuals with bilaterally compromised renal function [1]. Selective renal angiography to delineate the main renal artery and its branches prior to parenchymal-sparing surgery has become part of the preoperative evaluation. Knowledge of the number and location of these vessels helps greatly in removing the tumor with minimal blood loss and injury to the adjacent parenchyma [2].

Nowadays three-dimensional computerized tomography may serve as a useful noninvasive visualization of the three-dimensional relationship between the renal tumor,

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E-Mail karger@karger.ch Fax + 4161306 12 34

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Fig. 1. Computerized tomography showing solitary left kidney with multiple cysts and a solid mass in the lower pole.

Fig. 2. Three-dimensional spiral computerized tomography showing the left renal artery and its branches (red) with relation to the renal cysts and tumoral mass (blue) and normal renal parenchyma (green).

renal vasculature and collecting system prior to surgery [3].

This information is particularly helpful in planning renal parenchymal-sparing surgery in patients with solitary kidneys, as in our case.

It seems that this technique will play a greater part in future preoperative workups of RCC in patients with solitary kidneys.

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