Case report

Renal carcinoma with caval vein infiltration and triple coronary disease: one-stage surgical management

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Abstract

We report the one-stage surgical management in a 68-year-old patient with a renal cell carcinoma with extended intravascular growth into the inferior vena cava combined with severe triple coronary artery disease. After nephrectomy the resection of the intravascular tumor and caval reconstruction were performed in deep hypothermic circulatory arrest. Coronary revascularization was accomplished while rewarming. The postoperative course was uneventful. Nine months after this operation there are no signs of reoccurrence. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

The intravascular growth into the inferior vena cava up to the right atrium is a specific complication of renal cell carcinoma [1]. Various techniques have been described for the surgical approach in these tumors [1,2]. Because of the complexity of achieving vascular control in the juxtahepatic part of the vena cava, surgical treatment in deep hypothermic circulatory arrest using cardiopulmonary bypass has been established as an interdisciplinary concept by various groups [1,3–5]. We report the one-stage surgical management in a patient with a large renal cell carcinoma with continuous extension of the tumor up to the juxtahepatic vena cava combined with severe triple coronary artery disease of all three main coronary arteries.

2. Patient

In a 68-year-old man (180 cm, 87 kg) with macrohematuria, a computed tomography (CT) scan demonstrated a malignant tumor of the right kidney with continuous growth of a tumor cone into the subdiaphragmal vena cava (Fig. 1). Symptoms were a slight dyspnea after moderate stress representing NYHA-functional class II. The ECG demonstrated signs of a small inferior infarction. Coronary angiography and ventriculography revealed a severe triple-vessel disease and a global reduction of left ventricular function (ejection fraction 37%) with hypokinesis of the inferomedial, posteroapical and septal parts of the left ventricle.

3. Operative approach and outcome

Operation was conducted in an interdisciplinary fashion. For anesthesia sevoflurane was used in combination with sufentanil and pancuronium also at the time of cardiopulmonary bypass. In the first part of the operation urologists performed the in toto nephrectomy of the right kidney including the resection of the vascular hilus and the ureter through a median laparotomy. The in toto resection of the tumor together with the intracaval mass was impossible technically, because of the extended dimension of the tumor. Thereafter cardiopulmonary bypass was established using a venous two-stage cannula, positioned with the top in the right atrium. The patient was cooled to a lowest temperature of 17°C. Simultaneously the right saphenous vein was harvested for grafting. Reaching the minimal temperature, extracorporeal circulation was stopped and the vena cava and the right atrium were incised for uncompromised access (Fig. 2). The tumor thrombus was removed completely. The tumor infiltrated part of the vena cava between the right renal vein and the juxtahepatic part of the vessel was resected for a distance of 10 cm. The left-sided wall of the
vena cava was macroscopically without signs of infiltration. Part of a PTFE prosthesis (Gore-tex, W.L. Gore GmbH, Putzbrunn, Germany) was inserted as a semicircumferential patch in the open part of the vein with a running suture.
After 27 min of circulatory arrest the cardiopulmonary bypass was re-established and the patient rewarmed. For the coronary revascularization the aorta was clamped and crystalloid St. Thomas-II cardioplegic solution was injected into the ascending aorta. The distal anastomoses were performed in cardiac arrest. A sequential graft was applied to the first and second marginal branch and to the posterior interventricular branch. Another one was placed at the diagonal branch and the left anterior descending artery. The proximal anastomoses were performed using partial clamping of the ascending aorta during reperfusion of the heart. At a temperature of 36.5°C the patient was weaned from the extracorporeal circulation after a cardiopulmonary bypass time of 220 min. After closure of the thorax and the abdomen the patient came to the intensive care unit without any catecholamines.

Perioperatively the patient received 10 units of red blood cells, 6 units of fresh frozen plasma and 3 units with platelets. Extubation was achieved 12 h postoperatively. Anticoagulation using only intravenous heparin was applied for 7 days. The patient was transferred to the normal ward on the third and to the rehabilitation clinic on the 13th postoperative day. Nine months after the operation the patient showed no signs of recurrence as diagnosed by CT scan.

4. Comment

The intravascular growth into the renal and caval vein is a typical feature of renal carcinoma. Frequently the resection of these tumors with or without reconstruction of the infrahepatic caval vein is possible without cardiopulmonary bypass using a simple clamping technique. In contrast, tumors invading the juxtahepatic caval vein require an interdisciplinary therapeutic concept using hypothermic circulatory arrest as a saving procedure regarding complete tumor removal and bleeding control. In combination with coronary artery disease a one stage surgical management of both diseases should be attempted. The bypass grafting is easy to perform at the time of rewarming after tumor removal using hypothermic arrest. This new concept provides a patient-oriented approach reducing peri- or postoperative sequelae in these occasional patients.

References