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Case Reports

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ASSOCIATION OF CROSSED RENAL ECTOPIA AND AORTIC ANEURISM. CASE REPORT

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Summary.- *OBJECTIVE: Renal malformations are rare entities and rarely have clinical consequences. Crossed renal ectopia has an incidence of 1/2.000 autopsies. The association with aortic aneurysm is even more exceptional.*

METHODS: We present our case and perform a bibliographic review.

RESULTS: To date and in our knowledge, seven cases of crossed renal ectopia associated with aortic aneurysm were described on the literature. This malformation makes the treatment of the aneurysm more complex. The possibility of renal function decrease caused by injuries to the renal



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arteries during the surgical procedure is always present. Because of this risk of injury of the kidney during surgery preoperative evaluation of the vascularization must include image technologies as the MRI, CT-angiography or conventional arteriography. During the aortic intervention vascular conservation must be performed and it is necessary to minimize the time of renal ischemia.

CONCLUSIONS: The association of crossed renal ectopia and aortic aneurysm is a rare event. The surgical intervention of the aorta does not have to necessarily originate a loss of renal function. Anyway the worsening of the renal clearance must be foreseen.

Keywords: Crossed renal ectopia. Aortic aneurysm. Renal malformation.

Resumen.- **OBJETIVO:** La malformación renal es una entidad poco frecuente y rara vez tiene traducción clínica. La ectopia renal cruzada tiene una incidencia de 1 de cada 2.000 autopsias. Su asociación con un aneurisma aórtico es todavía más excepcional.

MÉTODOS: Presentamos nuestro caso y revisamos la literatura.

RESULTADOS: Hasta la fecha y en nuestro conocimiento hay descritos 7 casos de ectopia renal cruzada con fusión asociados a aneurisma aórtico. Este fenómeno hace que el tratamiento del aneurisma sea más complejo pudiendo ocasionar una disminución de la función renal por lesiones en su vascularización. Para evitarlo, la vascularización renal debe ser estudiada preoperatoriamente mediante pruebas como la RM, el Angio-Tac o la Arteriografía. Durante la intervención sobre la aorta se deben realizar técnicas de conservación vascular y se debe de minimizar el tiempo de isquemia renal.

CONCLUSIONES: La asociación de riñón ectópico cruzado y aneurisma de aorta es un evento raro. La cirugía o procedimientos sobre la aorta no tienen por qué acarrear una pérdida de función renal importante y ésta debe ser prevista antes de la intervención.

Palabras clave: Ectopia renal cruzada. Aneurisma aórtico. Malformación renal.

INTRODUCTION

The renal malformations are a slightly frequent entity and they rarely have clinical consequences. The renal crossed ectopia is the second anomaly in frequency of renal fusion after the horse-shoe kidney. It has an incidence of 1 of every 2.000 autopsies and 1 of every 1.000 newborns (1).

Several types are described: With fusion (85-90 %), without fusion (5-10 %), unilateral and bilateral. According to the fusion morphology the ectopia is described as sigmoid or s-shaped kidney, lump kidney, l-shaped kidney and disc kidney.

They are normally discovered incidentally in medical check up or in radiological image techniques requested for other pathologies evaluation. They usually don't have any influence on patient's survival and they rarely need treatment.

The incidence of aortic aneurysms ranges between the 1,8 and 6,6 % of autopsies and they suppose the 14th reason of death in the USA. It suppose a more common pathology and constitutes an important part of the vascular surgery activity (2).

The association of these two anomalies is a really exceptional phenomenon. The coexistence of these two malformations, suppose a challenge for the surgeon and often his treatment requires a multidisciplinary boarding.

CASE REPORT

A 54-year-old patient comes to the urology consultation presenting a macroscopic hematuria episode. The physical exploration showed a pulsatile mass in mesogastrium. Vesical ultrasound was realized and two exophytic formations with a maximum diameter of 2,5 cm, suggestive of urothelial tumour, were visualized. The flexible cystoscopy confirmed the diagnosis and the transurethral resection was indicated.

After the intervention the anatomopathologic analysis showed a slightly differentiated urothelial carcinoma, with glandular differentiation and muscular infiltration (pT2, G4). The surgical treatment proposed was the radical cystovesiculoprostatectomy.

In the extension study no signs of local or distant dissemination were observed. Incidentally a renal abnormality consisting in a crossed renal ectopia with fusion of the right kidney with the left one (Figure 1). CT image that show the crossed renal ectopia with fusion of the right kidney with the left one and the aortic aneurysm). An abdominal aortic aneurysm was also found. The aneurysm size was 8 x 4,9 cm, with a wall thrombus that was originating at 5,7 cm of the origin of the renal arteries and it was spreading up to the bifurcation iliac vessels. Two arterial branches of the ectopic kidney were coming from the wall of the aneurysm (Figure 2). Three-dimensional reconstruction of the crossed renal ectopia and aortic aneurysm. Two arterial branches of the ectopic kidney were coming from the wall of the aneurysm).

The possibility of realizing in the same surgical act a correction of the aneurysm and the cystoprostatectomy was rejected because of the clinical situation of the pa-



FIGURE 1. CT image that show the crossed renal ectopia with fusion of the right kidney with the left one and the aortic aneurysm.

tient and the big complexity of both surgeries. Finally the percutaneous boarding was chosen because it suppose a less aggressive procedure and in addition it would facilitate the later intervention. We assumed a possible loss of renal function caused by the prothesis collapse of the aortic branches that were departing from the wall of the aneurysm going towards the ectopic kidney.

The vascular surgery service performed the placement of the aortic prothesis. Renal dynamic gammagraphy was realized preoperatively in order to quantify the loss of

renal function. For the quantitative study, two areas of interest were delimited, a major size area on the top of the renal mass corresponding to the left kidney and a lower area of minor size corresponding to the ectopic kidney. The vascularization of this area was coming from the lowest part of the aorta coinciding with the aneurysm. The lower zone presented a limitation of the arrival of the radiodrug in the vascular and parenquimatous phases, with an obstructive excretory curve. The differential function percentage was 73,7 % of the left kidney vs. 26,3 % of the ectopic kidney.

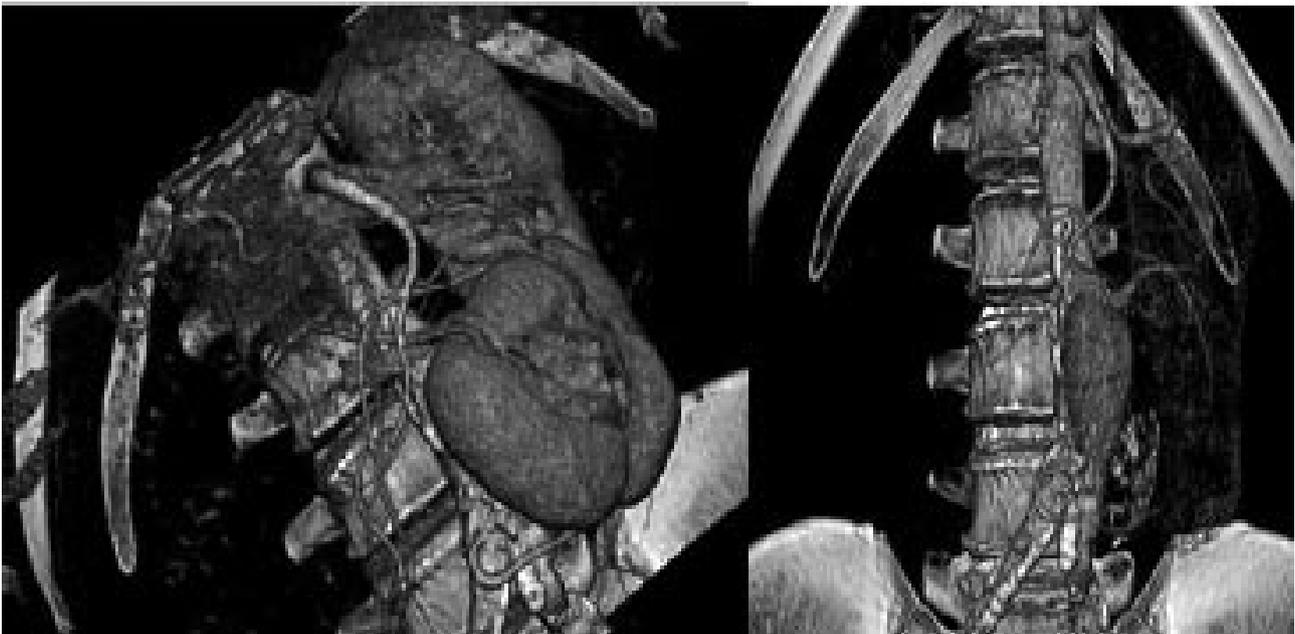


FIGURE 2. Three-dimensional reconstruction of the crossed renal ectopia and aortic aneurysm. Two arterial branches of the ectopic kidney were coming from the wall of the aneurysm.

A lower placement of the prosthesis was tried to avoid the collapse of the branches proceeding from the aorta. In spite of it the postoperative gammagraphy showed a practically total functional annulation of the ectopic kidney. The differential function of the left kidney region was 93 % opposite to 7 % of the portion corresponding to the ectopic kidney (Figure 3). Renal dynamic gammagraphy pre and postintervention. The postoperative gammagraphy shows a loss of function of the inferior ectopic kidney). One month later a radical cystectomy and orthotopic substitution was realized with an anatomopathologic result of slightly differentiated transitional cells carcinoma with muscular affection (pT3a, pN0, G3). In the 3 months review the creatinine was 1.2 mg/dl.

DISCUSSION

When a kidney crosses the middle line and places in the opposite side to the insertion of his ureter in the bladder, this condition is known as crossed renal ectopia. In 85-90 % of the cases the ectopic kidney fuses with the orthotopic kidney and this entity is known as crossed renal ectopia with fusion. It has an incidence of 1 of every 2.000 autopsies. This malformation meets more frequency in males (1).

They are normally asymptomatic cases and they usually appear incidentally. They are associated to other anomalies (muscle and bones, imperforated anus, cardiovascular, myelodisplasy, vesicoureteral reflux, multicystic displasia, testicular...) (3).

The fusion that we meet with more frequency is that of the superior pole of the crossed kidney with the inferior

pole of the orthotopic kidney (unilateral fusion). Mc Donald and McClellan in 1957 classified the renal ectopia in four types. The type A corresponds to the crossed renal ectopia with fusion, the type B to the crossed renal ectopia without fusion, the type C to the unique renal crossed ectopia and the type D to the bilateral renal crossed ectopia. Our case would be an A type (4). Normally the ureter of the ectopic kidney crosses the middle line and enters the bladder in his normal position. The renal pelvises are placed anteriorly by an incomplete rotation. The vascular support also can cross the middle line (5).

The ectopic kidneys can receive the vascularization from the aorta or even the iliac vessels (6,7). The number of branches also can be very variable. This capricious character requires an exhaustive study of the vessels with preoperative image techniques. These vascular anomalies are important and influential in the approximation and treatment of these patients. The venous drainage is usually anomalous but it is not as important for the future surgery (8).

The position of the ureter also can lead us to error. Even the normal finding is that the ectopic ureter reach the bladder in his right position, his abnormal way among the retroperitoneum can confuse the surgeon during the procedure. For this reason many authors place a urethral catheter before the intervention.

The literature contributes with a very small amount of cases of crossed renal ectopia with fusion and an aortic abdominal aneurysm associated. Up to the date there are 7 cases described with the mentioned characteristics and one more with no fusion of both kidneys (9).

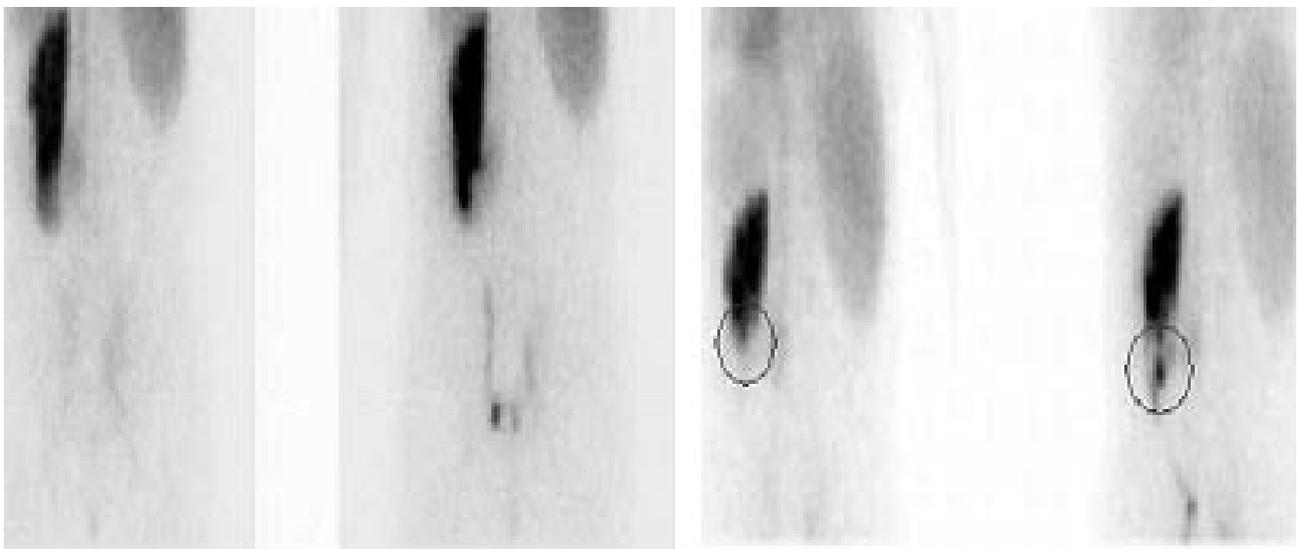


FIGURE 3. Renal dynamic gammagraphy pre and postintervention. The postoperative gammagraphy shows a loss of function of the inferior ectopic kidney.

The case that we sense beforehand is specially interesting because besides these two malformations the patient presents an urologic tumour that concerns the bladder. Up to the moment there are no published cases that join the three diseases. These three pathologies required a less conventional treatment and a detailed preoperative study with a multidisciplinary boarding.

The fact that part of the ectopic kidney vascularization was coming from the aneurysm wall made easier to cause a decrease of the renal function during the aortic surgery. To avoid the injury the renal vascularization was studied with an CT-angiography and three-dimensional reconstructions were realized to obtain a major anatomical precision. The ultrasound, the MR and the conventional arteriography are other image proofs can also help in the approximation of this type of pathology (10,11).

The election technique to treat the aneurysm would have been the open surgery because it allows a better preservation of the vessels minimizing the renal damage. The literature pleads for interventions among the aorta with vascular conservation techniques minimizing the renal ischemia time (12,13). The vessels must be respected realizing arterial reanastomosis or by-passes. Some authors use hypothermic perfusions of 4 C ° Ringer's solution to protect the kidney. In spite of all the surgery must be realized cautiously because the preoperative image techniques can unnotice small vessels.

We refused to realize both intervention in the same surgery because of the high complexity of both procedures and the increased risk of infection and postoperative morbidity. We also refused the open surgery for the aneurysm treatment because of the the need to perform the radical cystectomy in a second time and there were an increased risk of infection of the prothesis with a contaminated surgery.

The diuretic gammagraphy showed us an ectopic kidney with a poor renal function. For this reason we decided to perform an endovascular procedure sacrificing part of the vessels that arrived to this non functioning ectopic kidney.

Nevertheless in case of these endovascular procedures the placement of the prothesis not always carry a loss of all the branches proceeding from the aneurysmatic wall. In this case a lower placement of the prothesis was tried leaving the minimal number of excluded vessels. In spite of it, a loss of renal function was produced as the postoperative gammagraphy showed. Anyway in the three months review he only presented a very slight degree of renal insufficiency with a creatinine of 1.2 mg/dl.

CONCLUSIONS

The association of ectopic crossed kidney and an aortic aneurysm is a rare event.

The surgical intervention among the aorta does not have to originate necessarily a loss of renal function. Anyway the worsening of the renal clearance must be foreseen.

The renal diuretic gammagraphy is the gold standard technique to quantify the preoperative renal function and it is helpful to decide the boarding of the future intervention.

The renal vascularization must be a studied in the preoperative period with image techniques as the MR, the CT-angiography or even the conventional arteriography.

During the intervention among the aorta, vascular conservation techniques must be performed and it is necessary to minimize the renal ischemia time.

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