

Endovascular Treatment in Aortoiliac Occlusive Disease

Tratamiento endovascular en oclusiones aortoiliacas

MARTÍN RABELLINO¹, JOSÉ CHAS¹⁻³, LUCIANO LUCAS², VICENTE CESÁREO³, VADIM KOTOWICZ³, RICARDO GARCÍA-MONACO¹

ABSTRACT

Background: Open surgery is the traditional treatment of aortoiliac TASC type C and D lesions. However, as morbidity and mortality rates of open surgery are not negligible, endovascular treatment has emerged as a less invasive option over the last decade.

Objective: The aim of this study is to analyze our results with endovascular treatment of these iliac lesions using primary stenting technique.

Methods: We performed a retrospective and descriptive analysis of 32 endovascular interventions for TASC C-D lesions performed from January 2012 to October 2014, to evaluate technical success, perioperative mortality and patency.

Results: Technical success was achieved in the 32 (100%) lesions treated. Primary patency was 96.8% after a mean follow-up of 14 months. Cumulative mortality was 6.25% (2 patients) during follow-up.

Conclusions: In our experience, endovascular treatment of aortoiliac TASC type C and D lesions is a feasible and safe procedure with a high recanalization rate. Endovascular treatment of this type of lesions could be considered a valid option if these findings are confirmed in large, randomized, controlled trials comparing this strategy with surgery.

Key words: Ischemia Iliac Artery/pathology - Endovascular Procedures - Stents - Arterial Occlusive Diseases

RESUMEN

Introducción: La cirugía representa el tratamiento de revascularización tradicional para las lesiones aortoiliacas TASC tipos C y D. No obstante, la morbimortalidad de la cirugía abierta no es despreciable, motivo por el cual en la última década el tratamiento endovascular emerge como una alternativa menos invasiva.

Objetivo: Analizar los resultados en nuestra institución del tratamiento endovascular de estas lesiones ilíacas con técnica de stent primario.

Material y métodos: Se realizó un análisis retrospectivo descriptivo de 32 lesiones ilíacas TASC tipos C y D tratadas de forma endovascular desde enero de 2012 a octubre de 2014. Se evaluaron el éxito técnico, la mortalidad perioperatoria y la permeabilidad.

Resultados: Se consiguió el éxito técnico en las 32 (100%) lesiones tratadas. La media de seguimiento fue de 14 meses, con una permeabilidad primaria del 96,8%. La mortalidad acumulativa durante el seguimiento fue de 2 (6,25%) pacientes.

Conclusiones: En nuestra experiencia, en las lesiones TASC tipos C y D de la región aortoiliaca, el tratamiento endovascular es factible y seguro y presenta una tasa elevada de recanalización. Podría considerarse como una alternativa válida a la cirugía para este tipo de lesiones si estos hallazgos se confirman en estudios de mayores dimensiones, aleatorizados y comparativos de ambas terapéuticas.

Palabras clave: Isquemia arteria ilíaca/patología - Procedimientos endovasculares - Stents - Arteriopatías oclusivas

INTRODUCTION

Revascularization is the treatment of choice of extensive aortoiliac occlusive disease in patients with intermittent disabling claudication and critical ischemia of the lower extremities. Aortobifemoral and iliofemoral bypass and aortoiliac endarterectomy are the most common open surgical techniques for revascularization of these patients. Although the patency rate at 5 years is high (83.5%-88.3%), comorbidities are not

negligible, ranging between 12.7% and 16% with mortality rate of 2.7% to 4.1% depending on the technique used, with the lowest morbidity and mortality for endarterectomy. (1) Therefore, endovascular treatment emerges as a valid strategy in these patients.

The Trans Atlantic Inter-Society Consensus II (TASC II) classifies aortoiliac lesions into four types: A, B, C and D, depending on lesion morphology, (2) and recommends that type A-B lesions should be treated

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Address for reprints: Martín Rabellino - Servicio de Angiografía y Terapéutica Endovascular - Hospital Italiano de Buenos Aires, Universidad de Buenos Aires - J. D. Perón 4190 - (C1181ACH) CABA, Argentina - Tel. +54-11-4959-0453 - Fax +54-11-4959-0471 - e-mail: jose.rabellino@hospitalitaliano.org.ar

Hospital Italiano de Buenos Aires, Buenos Aires, Argentina.

¹ Department of Angiography and Endovascular Therapy.

² Department of Cardiology.

³ Department of Cardiovascular Surgery.

with endovascular procedures and type C-D should undergo open surgery, except for type C lesions in patients with high operative risk. In these patients, endovascular treatment represents the first-line therapy (Figure 1). (2)

Since the TASC II classification was published in 2007, several publications have made reference to endovascular treatment in these types of lesions. (3-6) The aim of this study was to analyze our results of endovascular interventions for aortoiliac TASC type C and D lesions with primary stenting and subsequent angioplasty.

METHODS

A retrospective, descriptive analysis of endovascular interventions for TASC type C and D lesions was performed from January 2012 to October 2014. Patients were followed-up with physical exam at 1, 3, 6 and 12 months and then annually. Color-Doppler echocardiography was performed every 6 months during the first year and annually thereafter. Dual antiplatelet therapy was administered after endovascular treatment with aspirin 100 mg indefinitely and clopidogrel 75 mg for 3 months.

Technical success was defined as revascularization of the occlusive lesion with less than 30% residual diameter stenosis and absence of dissection impairing blood flow at the

final angiographic control.

Perioperative mortality was defined as death occurring within the first 30 days after the intervention, and was classified as related or not related with the intervention.

Patency was assessed with color Doppler ultrasound, evaluating in-stent flow, spectral Doppler waveform analysis of the common ipsilateral femoral artery, and palpation of the ipsilateral femoral pulse which was classified as grade 0 (absent), grade 1 (decreased) and grade 2 (normal).

For the statistical analysis, values were expressed as percentages. The protocol was evaluated and approved by the Institutional Review Committee. As this was a retrospective study, no informed consent was required.

RESULTS

Between January 2012 and October 2014, 32 aortoiliac TASC type C and D lesions underwent endovascular treatment in 24 consecutive patients. Among the 24 patients treated, 19 (79.16%) were men with median age of 77 years (range 63-91 years) and 14 of these patients (58.34%) presented unilateral lesions. Seven patients (29%) had critical ischemia and 17 (71%) presented intermittent claudication at less than 200 meters walking distance. Eleven (34.37%) TASC type C lesions and 21 (65.62%) TASC type D lesions were treated. Risk factors are detailed in Table 1.

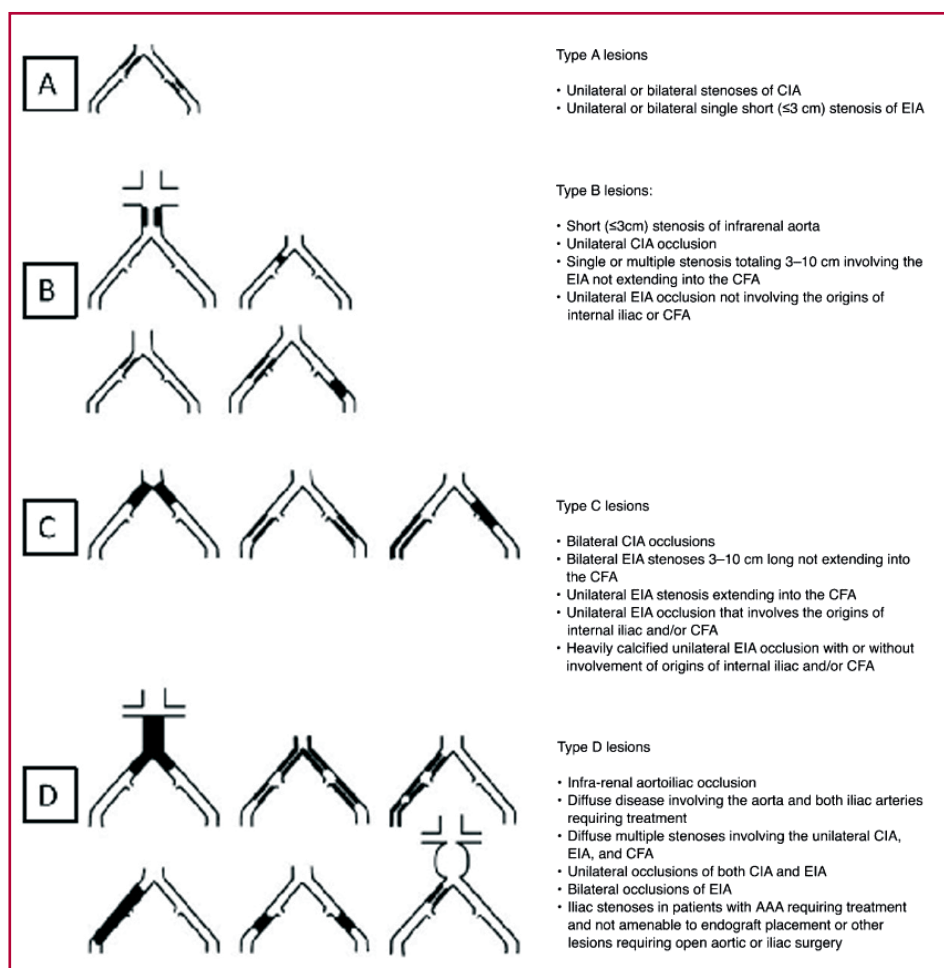


Fig. 1. TASC II classification (Trans Atlantic Inter-Society Consensus II). CIA: Common iliac artery. EIA: External iliac artery. CFA: Common femoral artery. AAA: Abdominal aortic aneurysm.

Primary stenting with subsequent angioplasty was performed in all cases (Figure 2). Fifty bare metal self-expandable nitinol stents were used with an average of 1.5 stents per lesion. Covered stents were not used in any case. Technical success was achieved in 100 % of the lesions treated.

Three patients presented hematoma at the puncture site that did not require further active care. Two patients died (cumulative mortality: 6.25%) during follow-up: 1 patient died 10 days after the intervention due to aspiration pneumonia and the other died three months later due to sepsis secondary to urinary tract infection. There were no deaths related with the procedure.

All the patients underwent clinical and radiological follow-up. Mean follow-up time was 14 months (2-26). Patency was evaluated by color Doppler echocardiography and was achieved in 97% of the cases, with triphasic waveform in the ipsilateral common femoral artery and normal (grade 2) femoral pulse in 29 (93.5%) lesions, as one patient developed moderate in-stent restenosis (50-70%) in the iliac axis treated, with reduced femoral pulse (grade 1). This patient remained

asymptomatic and did not require a new intervention. A second female patient with iliac TASC type D lesion and critical limb ischemia, presented thrombosis of the iliac axis 13 months after the procedure and required leg amputation.

Of the 30 patients followed-up, 28 (93.3%) remain without symptoms. One patient underwent major amputation and 2 patients (6.7%) continue with symptoms (claudication after walking 300 meters) with clinical improvement. The persistence of symptoms corresponds to concomitant femoropopliteal lesions with non-disabling claudication that was not necessary to treat. No reinterventions were performed during the follow-up period.

DISCUSSION

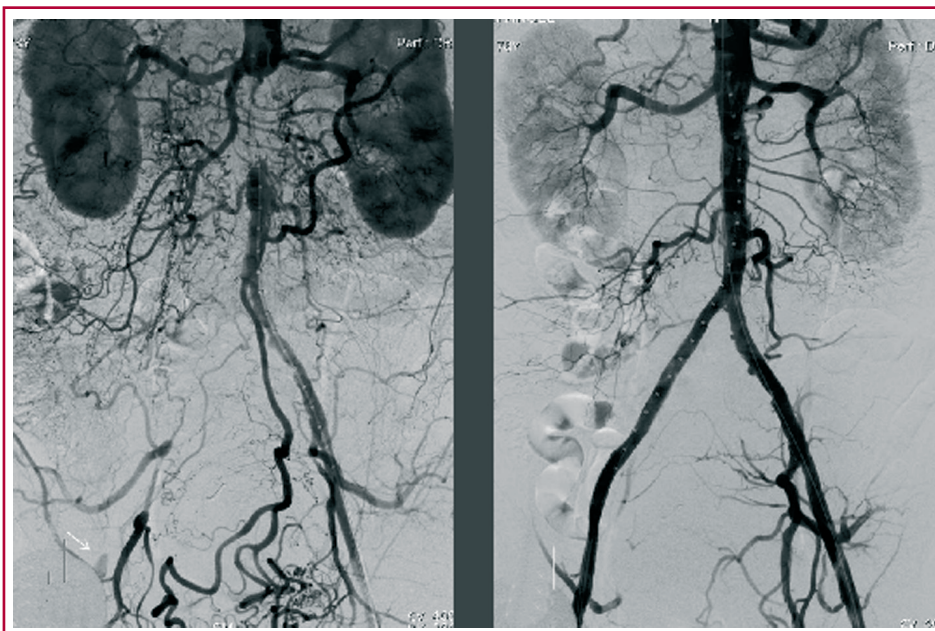
Open surgery still remains the treatment of choice for aortoiliac TASC II type C and D lesions. (2) However, as morbidity and mortality rates of open surgery are not negligible, endovascular treatment has emerged as a less invasive option over the last decade. Historically, endovascular treatment of long lesions has been associated with low recanalization rates, as Colapinto et al. reported in 1986. (7) In his publication, long lesions, currently known as TASC type C and D lesions, had a technical success rate of only 37%. In 2010, Jongkind et al. published a review of studies performed between 2000 and 2009 including 1,711 patients, and reported recanalization rates between 86% and 100%. (6) More recent studies have reported higher recanalization rates ranging between 92% and 99%. (3, 8) In our series, technical success was achieved in 100% of cases. This improvement is due to technical development and higher operator expertise.

Among the different revascularization techniques, primary stenting is the most widely used. (9) The tech-

Table 1. Risk factors

Diabetes	6 (25%)
Hypertension	24 (100%)
Dyslipidemia	15 (62.5%)
Current smoker	9 (37.5%)
Former smoker	10 (41.66%)
Chronic kidney failure in dialysis	1 (4.16%)
Coronary artery disease	7 (29.1%)

Fig. 2. Angiograms of a 77 year-old patient with Leriche syndrome, former smoker, with hypertension and dyslipidemia, who presented intermittent claudication of several months evolution in both lower extremities after walking 50 m. **A.** The angiography shows infrarenal occlusion of the abdominal aorta with distal recanalization and occlusion of the entire right iliac axis recanalized in the common femoral artery (white arrow) with abundant collateral circulation. The left iliac axis shows multiple stenoses of the common iliac artery. **B.** Control angiography after endovascular treatment with primary stenting showing blood flow restitution in the abdominal aorta and in both iliac axes, without residual stenosis and absence of collateral circulation.



nical success and the long-term patency achieved with this procedure are better than those of balloon angioplasty and elective stenting, and is consistent with the primary patency of 96.8% observed in our study. Abu Rahma et al. reported a global clinical success of 93% for patients treated with primary stenting vs. 46% for those treated with angioplasty and elective stenting. (10) In 100% of our cases, the technique of choice was primary stenting with self-expandable nitinol stents. A balloon expandable stent was implanted in only one patient due to extensive calcification of the lesions.

In their review, Jongkind et al. reported that primary and secondary patency of TASC type C and D lesions one year after endovascular treatment was 70% to 97% and 88% to 100%, respectively. At 4 and 5 years, primary patency was 60% to 86% and secondary patency 80% to 98%. (6) In our series, primary patency was 96.8% at a mean follow-up of 14 months, probably because all the patients underwent primary stenting and angioplasty alone was not used in any case.

Three patients presented hematoma at the puncture site that did not require active care. Ye et al. analyzed 7 studies including 323 patients and reported complications in 39 (12%) of cases. Complications occurred in 12 patients (3.7%) when the brachial artery route was used, 13 patients (4%) presented with distal embolism, 4 (1.2%) dissection in the treatment site, 6 (1.8%) had contrast-induced nephropathy, 2 (0.6%) rupture of the iliac artery, and one patient developed hypovolemic shock and stroke, with 2.9% global mortality. (11) In our experience, one death unrelated to the procedure occurred within 30 days after the intervention. In 2014, Klein et al. published an expert consensus statement for the appropriate use of endovascular treatment of aortoiliac TASC type C and D lesions, and reported that in experienced hands these lesions may be safely treated by endovascular methods. (12)

Limitations

These results should be analyzed considering the retrospective nature of a study performed in a single center, by the same operator and with a low number of patients.

CONCLUSIONS

In our experience, endovascular treatment of aortoiliac TASC type C and D lesions is a feasible and safe procedure with high recanalization rate. Primary and

secondary patency rates are similar to those of open surgery published in the literature, and with lower morbidity and mortality. Considering this experience, endovascular treatment of this type of lesions could become a valid option if these findings are confirmed in large controlled trials comparing both strategies.

Conflicts of interest

None declared. (See authors' conflicts of interest forms in the website/Supplementary material).

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