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## Unilateral Common Iliac Artery Ostial Lesion Stenting versus Kissing Stenting

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### ABSTRACT

**Background:** Iliac arteries are a common sites of occlusive atherosclerotic disease that is responsible for symptomatic arterial insufficiency of lower extremities and as atherosclerosis is a systemic disease, iliac diseases frequently have coexistent disease below inguinal ligament.

**Aim of the study:** This study aimed to assess using of unilateral Common iliac artery stent versus kissing stent as regard clinical and technical success in unilateral ostial common iliac artery lesions.

**Patients and Methods:** From December 2018 to December 2020 in Al-Azhar University Hospital and Military Hospitals in Cairo, we assigned 20 patients with unilateral common iliac artery ostial lesion to undergo either unilateral stent or kissing stent; in two equal groups. Patients were followed up clinical, technical success and complications.

**Results:** Regarding co morbidities, 80% were smokers, 40% were diabetic, 40% had hypertension (HTN), and 40% had ischemic heart disease (IHD). Regarding complication, 15% had small groin hematoma, 1% had distal emboli, 5% had arterial dissection and 5% had contrast induced nephropathy.

**Conclusion:** No significant difference between unilateral and kissing technique regarding clinical, technical success and complications. The unilateral stent is safe and effective as kissing stents in the treatment of unilateral common iliac artery ostial lesions as regarding to high technical, clinical success and patient clinical improvement.

**Keywords:** Kissing stent; iliac artery; ostial lesion; angioplasty.

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### INTRODUCTION

Iliac arteries are most common sites of the occlusive atherosclerotic disease that is responsible for symptomatic arterial insufficiency of lower extremities.<sup>1</sup> Iliac atherosclerosis may be asymptomatic or presented by acute ischemia, intermittent claudication, critical limb ischemia (CLI).<sup>2</sup> The advancing role of the minimal invasive vascular intervention is affected by multiple factors, including imaging technology advancement, reduced morbidity & mortality rate in endovascular interventions, as well as faster convalescence following percutaneous therapy when compared to surgery.<sup>3</sup> Due to low morbidity and mortality rates in iliac angioplasty, become a option to bypass surgery for treatment of short iliac occlusive lesions.<sup>4</sup> The Trans Atlantic Inter-Society Consensus (TASC) has published a consensus document with recommendation for treatment of peripheral arterial diseases.<sup>5</sup> The TASC classify iliac artery lesions according to complexity to Type A, B, C & D lesions. Endovascular therapy is the best choice for type A

lesions and surgery is preferred for type D lesions.<sup>5</sup> Lesions at the orifice of the common iliac artery at aortic bifurcation have another considerations as intervention on one iliac may lead to affect of origin of other iliac by moving of eccentric plaque so using of the kissing stent technique protect the other iliac origin.<sup>6</sup>

This work aimed to assess using of unilateral common iliac artery stent versus kissing stent as regard clinical and technical success in unilateral ostial common iliac artery lesions.

### PATIENTS AND METHODS

In this prospective study from December 2018 to December 2020 in Al-Azhar University Hospital and Military Hospitals in Cairo, we assigned 20 patients with unilateral ostial iliac lesion underwent either unilateral stent or kissing stenting; 10 patients in each group. Patients were followed for type of technical, clinical success and complications.

Inclusion criteria: Patient (male & female) with, unilateral ostial iliac artery lesion, disabling claudication pain not respond to medical treatment or have tissue loss or gangrene.

Exclusion criteria: Patients with short life expectancy or terminal patient, Previous stent implantation in the target vessel or Known hypersensitivity to contrast material or Renal function impairment or Patient with an abdominal aortic or iliac aneurysm.

For every patient, the following were required: Medical history and full physical examination, laboratory tests (complete blood count, complete coagulation profile, and kidney function test), and computed angiography.

## RESULTS

### Statistical Analysis:

Data entry, process with statistically analysis was carried out by MedCalc ver. 18.2.1 (MedCalc, Ostend, Belgium). Significant tests (Mann-Whitney's, Chi square tests, logistic regression analysis and Spearman's correlation) were used. Data presented and analysis was done according to the type of data (parametric and non-parametric) obtained for each variable. P-values less than 0.05 (5%) was considered to be statistically significant.

### Discriptive statistics:

Mean, Standard deviation ( $\pm$  SD) and range numerical data, while Median and Inter-quartile range (IQR) non-parametric data. Frequency and percentage of non-numerical data.

### Analytical statistics:

Mann-Whitney's Test (U test) used to evaluate the statistical significance of the difference of a non-parametric variable between two study groups. Chi-Square test was used to assess the relationship between two qualitative variables. Correlation analysis (using Spearman's method): To assess the strength of association between two quantitative variables. The correlation coefficient denoted symbolically "r" defines the strength and direction of the linear relationship between two variables. Logistic regression: useful in the prediction of the presence or absence of an outcome based on a set of independent variables.

Table 1 shows that there is 16 (80%) males, 4 (20%) females, 9 (45%) <60 years old, 11 (55%) >60 years old, the mean of age 61.35 ( $\pm$  6.57 SD).

Regarding comorbidities, Table 2 shows that there is 16 (80%) had HTN, 7 (35%) had hyperlipidemia, 8 (40%) had DM and 8 (40%) had IHD.

Table 3 shows that there is 4 (20%) non-smokers and 16 (80%) smokers.

Table 4 shows that ipsilateral and contralateral femoral access used in 16 (80%) of cases and left brachial access and contralateral femoral access used in 4 (20%).

	No.	%
Gender		
Male	16	80.0
Female	4	20.0
Age (years)		
<60	9	45.0
>60	11	55.0
Min. – Max.	51.0 – 77.0	
Mean $\pm$ SD.	61.35 $\pm$ 6.57	
Median (IQR)	61.0 (57.0 – 64.0)	

**Table 1:** Distribution according to demographic data (n = 20) (IQR: Inter quartile range).

Co-morbidity	No.	%
HTN	16	80.0
Hyperlipidemia	7	35.0
DM	8	40.0
IHD	8	40.0

**Table 2:** Distribution according to co-morbidity (n = 20).

Special Habits	No.	%
No smoker	4	20.0
Smoker	16	80.0

**Table 3:** Distribution according to special habits (n = 20).

Access	No.	%
Ipsilateral and contralateral femoral access	16	80.0
Left brachial access and contralateral femoral access	4	20.0

**Table 4:** Distribution according to access (n = 20).

ABPI	Pre-operative (n = 20)	Post-operative (n = 20)	t	p
Min. – Max.	0.30 – 0.48	0.78 – 0.93	36.822*	<0.001*
Mean $\pm$ SD.	0.38 $\pm$ 0.06	0.88 $\pm$ 0.04		
Median (IQR)	0.39 (0.32 – 0.43)	0.89 (0.86 – 0.91)		

**Table 5:** Comparison between the pre and post-operative ABPI:

Complications	No.	%
<b>Groin heematoma</b>		
No	17	85.0
Yes (small hematoma manged conservative)	3	15.0
<b>Retroperitoneal heematoma</b>	0	0.0
<b>Stent mal position</b>	0	0.0
<b>Distal embolization</b>		
No	19	95.0
Yes represented by blue toe syndrome treated by SC anticoagulant & getting better after 2 week	1	5.0
<b>Acute Thrombosis</b>	0	0.0
<b>perforation / rupture</b>	0	0.0
<b>Arterial dissection</b>		
No	19	95.0
Yes (common iliac artery) treated by stent	1	5.0
<b>Stent infection</b>	0	0.0
<b>Contrast induced nephropathy CIN</b>		
No	19	95.0
Yes (s.cr:2.3 post-operative & treated conservative return to normal level within 3 weeks	1	5.0

**Table 6:** Distribution according to complications (n = 20)

Technical success	No.	%
<b>Angiographic appearance</b>		
Complete angiography without residual stenosis denote technical success	20	100.0
<b>Pressure gradient by duplex</b>		
Less 10 mm Hg	20	100.0

**Table 7:** Distribution according to technical success (n = 20)

Follow up by duplex	Technique				$\chi^2$	FE <sub>p</sub>
	Unilateral (n = 10)		Kissing (n = 10)			
	No.	%	No.	%		
<b>6 month</b>						
Patent stent with good inflow	9	90.0	10	100.0	1.053	1.000
Claudication pain again at 100 meter significant stenosis occur treated by ballon expandable stent	1	10.0	0	0.0		
<b>1 year</b>						
Patent stent with good inflow	9	90.0	10	100.0	1.053	1.000
Chronic renal failure & died	1	10.0	0	0.0		

**Table 8:** Relation between technique and follow up by duplex (n = 20)

**DISCUSSION**

Endovascular intervention is now the preferred option for treating obstructive atherosclerotic diseases of the iliac arteries due to the fast development of endovascular devices and increase of practitioners experience.<sup>7</sup> Unilateral CIA ostium lesions have been treated with kissing stents to avoid plaque shifting and embolization to the contralateral iliac artery. However, the kissing stents technique requires more devices, bilateral femoral artery access.<sup>8</sup> The aim of this work to assess using of unilateral CIA stent vs kissing stent as regard clinical and technical success. In our study there is 16 (80%) males, 4 (20%) females, 9 (45%) <60 years old, 11 (55%) >60 years old, the mean of age 61.35 (± 6.57 SD).

In a study showed that the patients were a mean age was 68 years (range, 37-83 years).<sup>9</sup> He showed that 86.3% male in his study. In our study there is 16 (80%) had HTN, 7 (35%) had hyperlipidemia, 8 (40%) had DM and 8 (40%) had IHD. In a study showed that there were 37% of his patients suffer from hypertension, 21% with Hyperlipidemia, 8% with diabetes.<sup>9</sup> In our study that there is 4 (20%) non-smokers and 16 (80%) smokers. In a study showed that there were 58% smokers, 33% ex-smoker.<sup>10</sup> In our study there is 1 (5%) had Gangrenous patch at tip of left big toe (tissue loss) , disabling claudicating pain hip & buttocks, 15 (75%) had Disabling claudicating pain hip & buttocks, 1 (5%) had Gangrenous skin of dorsum of forefoot of rt foot and 2 (10%) had rest pain, 1 (5%) had Gangrenous patch of rt heel. In a study reported that following procedure, the ABI significantly increased in all the patients (pre ABI vs. post ABI mean values were 0.4

vs. 0.82;  $p = 2.20 \times 10^{-16}$ ).<sup>11</sup> Our study shows that according to technical success there is 20 (100%) had complete angiography without residual stenosis denote technical success and 20 (100%) had pressure gradient by duplex less than 10 mmHg. In a study showed that the procedure was technically successful in 100% of patients.<sup>12</sup> Our study shows that according to complication there is 3 (15%) had groin hematoma, 1 (5%) had distal embolization, 1 (5%) had arterial dissection, 1 (5%) had contrast induced nephropathy CIN. In study showed that a hematoma at the puncture site occurred in 15 (7.1%) of 212 groins, but none required surgical repair.<sup>13</sup>

Our study shows that there no significant difference between Unilateral and kissing technique as regards sex and age. In a study showed that Baseline clinical characteristics (including age and sex) has not insignificant different between the both group.<sup>9</sup> In a study using kissing stent, Duplex imaging diagnosed significant restenosis in 15 (14.8%) of 101 patients and restenosis in 4 (4%), with recurrent symptoms in 17 (89.5%) of these 19 patients.<sup>13</sup> Our study shows that there no significant difference between Unilateral and kissing technique as regards access (Ipsilateral and contralateral femoral access & Left brachial access and contralateral femoral access). A study by Suh, Y et al reported that there no significant difference between single-stent and kissing technique as regards access (unilateral femoral, Bilateral femoral, Brachial artery).<sup>9</sup> Our study shows that there no significant difference between Unilateral and kissing techniques as regards ABPI (pre-operative and post-operative). A study by Suh, Y et al reported that Post procedural ABPI in the both limb did not differ between the two groups.<sup>9</sup> The study reported that there no significant difference between single-stent and kissing technique as regards ABPI (ipsilateral or contralateral).<sup>9</sup> Our study shows that there no significant difference between Unilateral and kissing techniques as regards complication. Another study reported that major complications between the two groups were not significant.<sup>9</sup>

## CONCLUSION

In our study, the unilateral stent technique is safe and effective like kissing stent technique in unilateral common iliac artery ostial lesions treatment as regarding to high technical, clinical success and patient clinical improvement.

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