

## 신동맥 협착에서의 스텐트 삽입술

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= Abstract =

### Stenting in Renal Artery Stenosis

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**Background :** Renal artery stenosis(RAS) is a major cause of renovascular hypertension and reduced renal function due to ischemic atrophy of kidney. There are several methods to treat the RAS, including are surgery, percutaneous transluminal renal angioplasty, and medical treatment. The purpose of this study is to evaluate the usefulness, safety, and efficacy of percutaneous transluminal stent deployment in RAS.

**Method :** From January 1995 to July 1996, 17 patients underwent renal stent implantation due to renal artery stenosis(11 male, 6 female). The mean age was 49 years old, one patient had both renal artery stenosis and total lesions were 18. The causes of renal artery stenosis were atherosclerosis in 12, fibromuscular dysplasia in 2, Takayasu's disease in 2, and autoimmune disease(Bechet's) in one case. Renal artery stenting was performed via femoral artery in 12 lesions and brachial artery in 6 lesions. Follow up was performed by renogram, renal angiogram, and clinical examination.

**Result :** The degree of renal artery stenosis was 83%(70 -95%). The lesion sites were 12 ostial and 6 non-ostial lesions. The used renal stents were Palmaz-biliary stent in 17 lesions and Micro-II stent in one lesions. All stents were implanted successfully and there was no residual stenosis in all patients except one case showed 20% residual stenosis due to huge renal artery size. The transstenotic pressure gradients after renal artery stenting was decreased markedly from 74mmHg to 2mmHg. There was no serious complications such as a death, emergency surgery, or nephrectomy. There were two minor complications which were one case of pyelonephritis and one case of inguinal hematoma. After stenting, blood pressure was decreased partially in 13 patients and completely in 2 cases.

**Conclusion :** Renal artery stenting appears to be safe and feasible and the alternative treatment modality to surgery for renal artery stenosis.

**KEY WORDS :** Renal artery stenosis · Renal stent.

서 론

가 가

5000 5 French multi - purpose catheter 0.035 Terumo wire fluoroscopy guide Hexabrix (retrograde) (anterograde)

1-3) (Pe - rcutaneous Transluminal Renal Angioplasty : PT - RA)

4-8) PTR A

9)

10-16)

4

14

6 12

(Table 2).

Terumo 0.035

PTRA 0.035 Am - platz extra - stiff

(100mg 300 mg) (Ticlopidine 500mg) 1

## 연구 대상 및 방법

### 1. 연구 대상

1995 1 1996 7

17 ( 11 , 6 )

10 2

6

1

stent 18

49 (22 76)

12 ,

(fibromuscular dysplasia) 2

2 1 가 (Bechet's disease) (Table 1).

### 2. 연구 방법

Seldinger . Sheath

**Table 1.** Clinical characteristics of patients

Age (years)	49(22 - 76)
Sex(M/F)	11/6
Clinical diagnosis	
Arteriosclerosis	12
Fibromuscular dysplasia	2
Takayasu's arteritis	2
Autoimmune disease(Bechet's disease)	1
Hypertension	
Essential	6
Secondary	10

M : Male F : Female

**Table 2.** Diagnostic and therapeutic approach

Diagnostic approach	
Brachial artery	4
Femoral artery	14
Therapeutic approach	
Brachial artery	6
Femoral artery	12

가 10mmHg ,  
가 5mmHg .

## 연구결과

### 1. 대상 환자의 임상상

17 16  
10 2 6  
(Table 1). 1  
4 , 10 ,  
가 3 . 가 1 ,  
(Table 3).  
가 7 .  
12 , (fibromuscular  
dysplasia) 2 2 1  
(Table 1).  
18  
(Table 4).

### 2. 시술 결과

83%(70 95%)  
ostial lesion 12 , non - ostial  
lesion 6 가 12  
6 . 1cm  
13 (Table 5).  
12 6

**Table 3.** Associated diseases

Diabetes mellitus	4
Ischemic heart disease	
angina pectoris	8
old MI	2
Peripheral vascular disease	3
Renal insufficiency	1
MI : Myocardial infarction	

**Table 4.** Procedural data of patients undergoing renal artery stenting

Renal stents	
Unilateral	16 patients
Bilateral	1 patients

Palmaz biliary stent  
17 Micro - II stent 1 (Table 6).  
Micro - II stent 가  
. Palmaz biliary stent P104가 11 , P154가 1 ,  
P204가 4 , P308 1 .  
가 (Fig. 1)  
1 20%  
17 10% (Fig. 2).  
가  
74.3 ± 46.0mm Hg 2.3 ± 3.4mmHg ,  
32.0 ± 24.8mmHg 1.7 ± 2.5mm  
Hg (Table 7, Fig. 3).

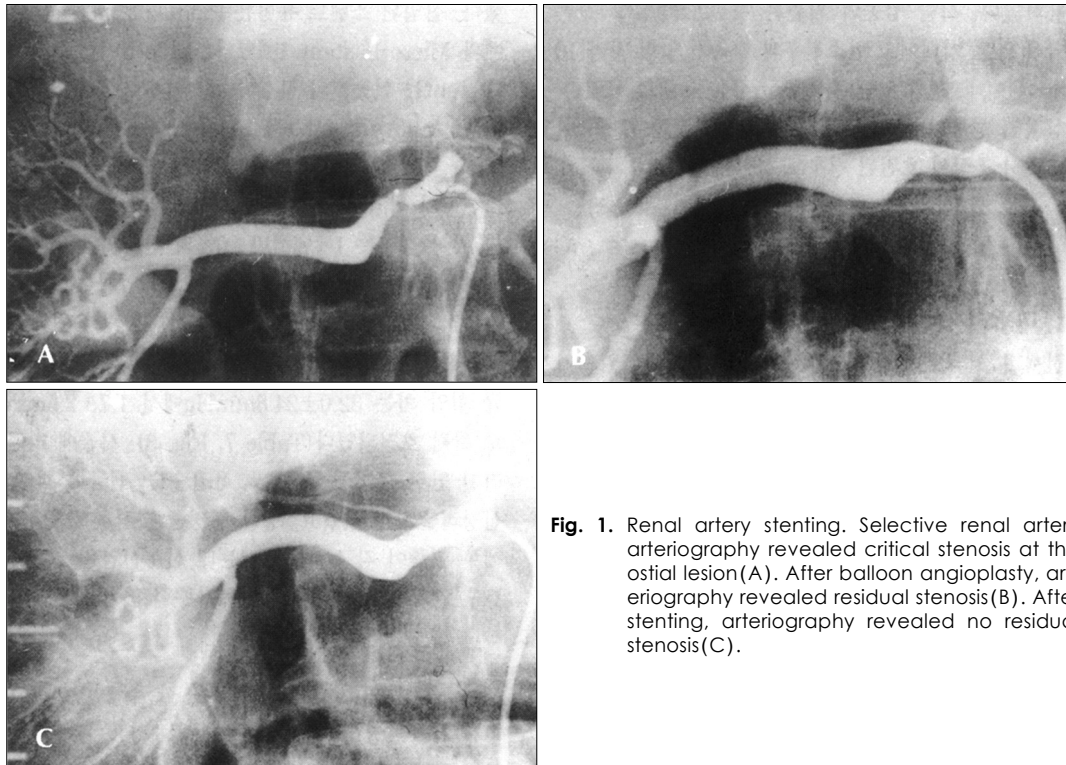
### 3. 추적 관찰 결과

**Table 5.** Lesion characteristics

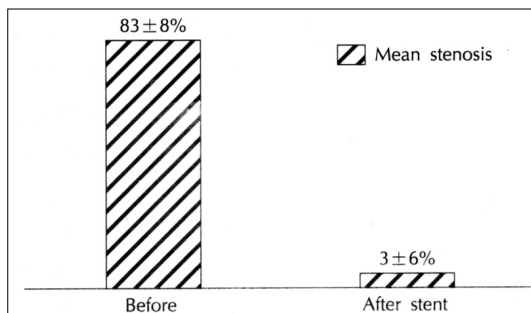
Lesion sites	
Left	12
Right	6
Stenotic site	
Ostium	12
Non-ostium	6
Total length of lesion	
< 1cm	13
1 - 2cm	4
> 2cm	1
Degree of occlusion(%)	83

**Table 6.** Stent characteristics

Stent length	
< 10mm	11
10 ~ 20mm	6
> 20mm	1
Stent types	
Palmaz biliary	
P104	11
P154	1
P204	4
P308	1
Micro-II	1



**Fig. 1.** Renal artery stenting. Selective renal artery arteriography revealed critical stenosis at the ostial lesion(A). After balloon angioplasty, arteriography revealed residual stenosis(B). After stenting, arteriography revealed no residual stenosis(C).



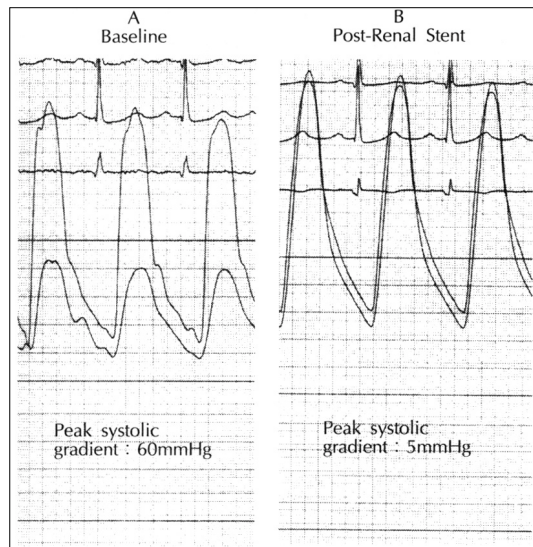
**Fig. 2.** The mean(diameter) stenosis before and after stent insertion.

**Table 7.** Transstenotic pressure gradient and diameter stenosis measurements after renal artery stenting

Pressure gradient across lesion	Mean gradient (mmHg)	Peak gradient (mmHg)
Prior to stenting	32.0 ± 24.8 ( 8 - 90)	74.3 ± 46.0 (12 - 160)
After stenting	1.7 ± 2.5 ( 0 - 5)	2.3 ± 3.4 ( 0 - 10)
p-value	<0.01	<0.01
Diameter stenosis		
Prior to stenting	82.8 ± 7.9% (70 - 95)	
After stenting	3.3 ± 6.2% ( 0 - 20)	
p-value	<0.01	

15  
8.5 (4 12 )  
15 10 renogram 가  
10 10 renogram 10  
3 6 7  
restenosis patent  
가 15  
mmHg 131mmHg 164  
96mmHg

82mm Hg  
(Table 8). 15  
가 13  
2  
고 안  
가 2



**Fig. 3.** Simultaneous transstenotic renal artery pressure recordings : (A) baseline, (B) post-renal stent abolition of the gradient.

**Table 8.** Blood pressure before and after renal stenting

	Systole(mmHg)	Diastole(mmHg)
Before stenting	163.53 ± 30.40	96.47 ± 14.97
After stenting	131.15 ± 12.93	81.92 ± 5.60
p-value	<0.002	<0.001

가 . 가

가 3) .

PTRA가 4 - 8) . PTRA

가 가 . 가

PTRA 20 24% 24 - 27) . 32) .

de novo stent

가 PTRA가 .

가 aorta . ostial lesion

가 fibrous tissue lesion elastic recoil nidus

PTRA 28) . 14) .

25,27) . 30% 가

24) . PTRA

5 33% 가

PTRA 1 25,27,29,30) . 33) . 가

PTRA 31) .

가 14,15) .

10,16) . elastic

recoil . 가 가

Pal - maz balloonexpandable stent(for the biliary sys - tem) , non - artic - 20% 가

ulated unmounted stents P104 2.5mm 10mmHg , 가 5mmHg

4mm 9mm . 3%

9.9mm 7.8mm 가 2mmHg,

가 2nnHg . , ,

cholesterol emboli 11,14,15) .

1 ( , ) .

가 31) . 20 38% 11,14,15) .

neointimal proliferation

ostial lesion

가

가

15

mmHg

164mmHg 131

96mmHg 82mmHg

15

17

49 (22 76)

가 2 (13.3%) 13

(86.7%)

18

12 ,

(fibromuscular dysplasia) 2

2 1

12 6

renogram,

가

가

결 과 :

83%(70 95%)

ostial lesion 12 , non -

ostial lesion 6 .

biliary stent 17 Micro - II 1

가

1 20%

17

74mmHg

가 가

2mmHg

1

가 15

(Percutaneous Transluminal Renal

Angioplasty : PTRa)

PTRA

164mmHg 131mmHg

96mmHg 82mmHg

15

가 2

13

결 론 :

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