

**RENAL ANGIOPLASTY AND STENTING UNDER
PROTECTION .LIMITATIONS
FIRST HUMAN STUDY WITH A 3D FILTER
THE FIBERNET®**

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RENAL ARTERY DISEASES

ETIOLOGY

- **ATHEROSCLEROTIC STENOSIS :**
 - **80-90% OF THE CASES OVER 40 YEARS**
- **FIBROMUSCULAR DYSPLASIA (< 10%)**
- **ARTERITIS (takayasu' disease)**
- **NEUROFIBROMATOSIS**
- **RENAL ARTERY TRANSPLANT**
- **RENAL BYPASS GRAFT**
- **RADIATIONS**

RENAL ARTERY STENOSIS MANAGEMENT

RENAL ARTERY STENTING

THE FIRST TREATMENT TO BE PROPOSED

- TECHNICAL SUCCESS: 98 TO 100%
- GOOD ANATOMICAL RESULTS
- FEW COMPLICATIONS
- LOW RESTENOSIS RATE
- GOOD LONG TERM PATENCY

RENAL ARTERY STENTING

EFFECTS ON RENAL FUNCTION

RENAL ARTERY STENTING EFFECT ON RENAL FUNCTION

AUTHORS	YEAR	PTS (n)	IMPROVED (%)	STABLE (%)	WORSE (%)
DORROS (21)	1995	69	30	48	22 *
IANNONE (28)	1996	63	36	46	18
TAYLOR (26)	1997	39	33	29	38 *
BLUM (19)	1997	68		100	
HARDEN (27)	1997	32	34	34	28 *
BOISCLAIR (45)	1997	33	41	35	24 *
PAULSEN (37)	1999	135	23	56	21 *
ISLES (44)	1999	379	26	48	26 *
RODRIGUEZ LOPEZ (38)	1999	108		95,5	4,5
HENRY (17)	1999	235	29	67	4
RUNDBACK (82)	1999	45	25	43	32
GUERRERO (41)	2002	61	19	50	31 *
ALLAQUABAND (83)	2003	22	50	23	27 *
HALLER (84)	2004	261		86	14
ZELLER (34)	2004	340	34	39	27
OVERALL		1890	25,3	53,3	21,4

* PATIENTS WITH BASELINE SERUM CREATININE \geq 1,5 mg/DL

RENAL ANGIOPLASTY STENTING

Categorical Changes in Serum Creatinine Concentrations According to Baseline Renal Function, Degree of Nephrosclerosis, Diabetes Mellitus, and Bilateral Intervention

	Baseline Renal Function*			Resistance Index			Diabetes		Intervention	
	Normal (n=176)	Mild to Moderate Impairment (n=130)	Severely Impaired (n=24)	<0.7 (n=112)	0.7-0.8 (n=168)	>0.8 (n=50)	No	Yes	Bi	Uni
							(n=208)	(n=122)	(n=85)	(n=245)
Improved	20%	46%	71%	28%	37%	37%	34%	34%	41%	32%
Unchanged	44%	36%	21%	45%	36%	35%	33%	42%	36%	40%
Deteriorated	36%	18%	8%	27%	27%	28%	33%	24%	23%	28%

◆ Bi: bilateral, Uni: unilateral.

* Normal: serum creatinine <1.2 mg/dL, mild/moderate impairment: serum creatinine 1.21 to 3 mg/dL, severely impaired: serum creatinine >3.0 mg/dL.

RENAL ARTERY STENTING EFFECT ON RENAL FUNCTION

- **82 PATIENTS**
- **96 R.A.S. WITH MODERN LOW PROFILE SYSTEMS**
- **TECHNICAL SUCCESS : 98%**
- **RENAL FUNCTION AT 1 YEAR**
 - **IMPROVED : 53%**
 - **STABLE : 53%**
 - **WORSE : 24%**

RENAL ARTERY STENTING

A CONCERN

**DETERIORATION OF RENAL
FUNCTION AFTER R.A.S. :**

20 TO 30 %

**PROGRESSIVE RENAL DYSFUNCTION
AFTER STENTING
ETIOLOGY AND TIME COURSE**

ETIOLOGY	TIME COURSE
CONTRAST MEDIA	1 – 2 DAYS
GLOMERULA INJURY HYPERPERFUSION SYNDROM	DAYS TO WEEKS
PROGRESSIVE NEPHROSCLEROSE	MONTHS TO YEARS
RESTENOSIS	3 – 6 MONTHS
ATHERO - EMBOLI	3 – 4 WEEKS

RENAL ARTERY STENTING

ROLE OF PROTECTION DEVICES

■ IT IS NOW CLEAR THAT ATHEROEMBOLI ARE THE RULE IN ANY INTERVENTION IN ATHEROSCLEROTIC DISEASE AND SEEM THE ROOT CAUSE OF MANY PROCEDURAL COMPLICATIONS WHENEVER ATHEROSCLEROTIC LESIONS ARE TREATED

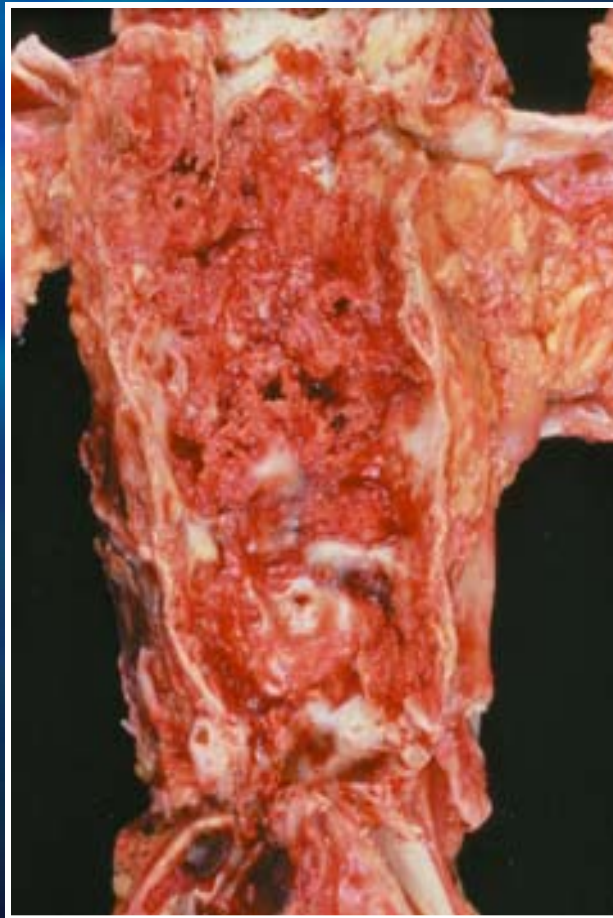
■ IT WAS WELL DEMONSTRATED IN SAPHENOUS BY PASS AND IN CAROTID ANGIOPLASTY

RENAL ARTERY ANGIOPLASTY

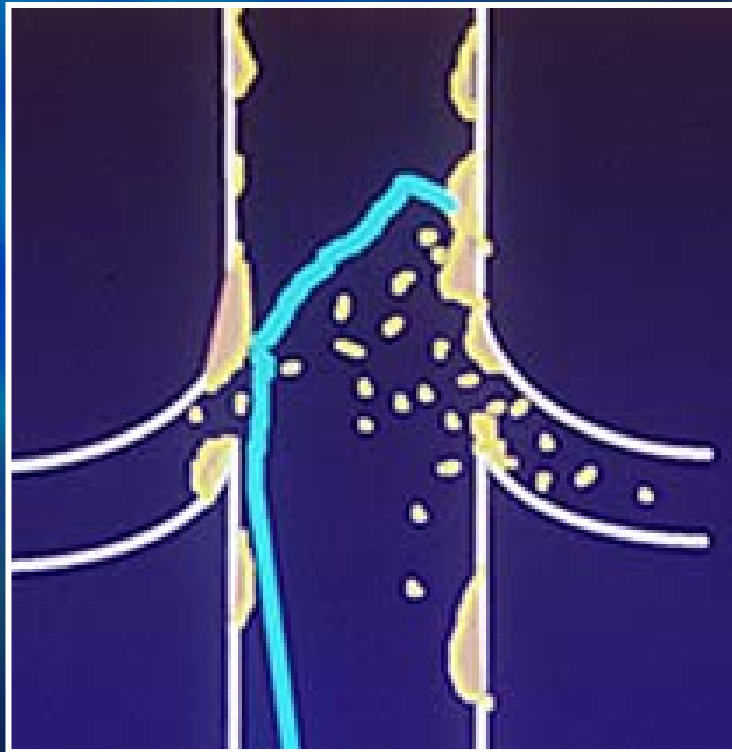
RENAL ATHEROEMBOLISM

- **AS IN OTHER TERRITORIES
ATHEROEMBOLI SHOULD PLAY AN
IMPORTANT ROLE IN RENAL
CIRCULATION AND EXPLAIN SOME
COMPLICATIONS (R.F. DETERIORATION)**

ATHEROEMBOLISM



ATHEROEMBOLISM



DISTAL PROTECTION DURING RENAL ARTERY STENTING

ATHEROEMBOLISM - ETIOLOGY

MOST ATHEROMATOUS OSTIAL STENOSES INVOLVE ATHEROMA OF THE AORTIC WALL

■ ATHEROMATOUS DEBRIS ARE DETACHED DURING :

- **ANGIOGRAPHY**
- **INSTRUMENTAL MANIPULATIONS IN AORTA -RENAL ARTERIES
(CATHETERS, WIRES, GUIDING CATHETERS, BALLONS, STENTS...**

■ PROMOTING FACTORS

- **LENGTH OF THE PROCEDURE**
- **DIFFICULTIES OF THE PROCEDURE**
- **SIZE OF THE DEVICES**
- **ELDERLY PATIENTS**
- **ATHEROMATOUS AORTA**

**SHOWERS OF CHOLESTEROL CRYSTALS FROM
ATHEROSCLEROTIC AORTA THAT OCCLUDE SMALL ARTERIES**

RENAL ARTERY STENTING ATHEROEMBOLISM

- **33 EX VIVO RENAL ANGIOPLASTY AND STENTING OF HUMAN RENAL ARTERY ATHEROSCLEROTIC SPECIMENS REMOVED DURING AORTO RENAL ENDARTERECTOMY**
- **TECHNICAL SUCCESS : 31/33**
 - **0,018 GUIDE WIRE**
 - **3 TO 5 mm BALLOONS**
 - **5/6 mm WALLSTENT**
- **EMBOLIC PARTICLES COLLECTED IN THE EFFLUENT AFTER EACH MANIPULATION**

RENAL ARTERY STENTING ATHEROEMBOLISM

■ RESULTS

- EACH MANIPULATION OF THE SPECIMENS INCLUDING SIMPLY ADVANCING THE GUIDEWIRE THROUGH THE LESION RELEASED THOUSANDS OF FRAGMENTS
- THE NUMBERS OF FRAGMENTS IN EACH SIZE CATEGORY INCREASED WITH DECREASING PARTICLES SIZE
- POSITIONING AND DEPLOYING THE STENT RELEASED AN ADDITIONAL BOLUS OF FRAGMENTS SIMILAR TO THAT RELEASED AFTER BALLOON ANGIOPLASTY

RENAL ARTERY STENTING ATHEROEMBOLISM

■ CONCLUSIONS

- EX VIVO RENAL ANGIOPLASTY RELEASED THOUSANDS OF ATHEROSCLEROTIC FRAGMENTS OF SUFFICIENT SIZE TO CREATE VASCULAR OCCLUSIONS AND INITIATE SIGNIFICANT RENAL PARENCHYMAL DAMAGE**
- THE RESULTS OF RENAL ANGIOPLASTY PROCEDURES COULD BE IMPROVED BY PLACING DISTAL PROTECTION DEVICES TO PREVENT ATHEROEMBOLIZATION**

RENAL ARTERY STENTING ATHEROEMBOLISM

- **ATHEROEMBOLI TYPICALLY OCCLUDE THE MEDIUM SIZED ARTERIOLES (150 TO 200 μm IN DIAMETER) AND GLOMERULAR CAPILLARIES . THE INVOLVEMENT USUALLY IS PATCHY**
- **THE PATHOGENESIS OF RENAL FAILURE MAY BE DUE ENTIRELY TO OCCLUSION OF THESE VESSELS**
- **BUT REACTIVE INFLAMMATION SURROUNDING THE CHOLESTEROL CRYSTALS MAY PLAY A SIGNIFICANT ROLE IN CAUSING THE LUMINAL OCCLUSION AND SUBSEQUENT RENAL FAILURE**

ATHEROEMBOLIC RENAL DISEASE

DIAGNOSIS

■ TRUE INCIDENCE : UNCERTAIN

- PROVEN IN 2-3% (BIOPSY, SEVERE GENERALISED SYSTEMIC CHOLESTEROL EMBOLISATION)
- REAL INCIDENCE : MUCH HIGHER . DIFFICULT TO PROVE

■ AATHEROEMBOLISM REDUCES FUNCTIONAL RENAL MASS

- SILENT COURSE ; LITTLE CHANGE OR NO CHANGE IN RENAL FUNCTION IN SOME PATIENTS DUE TO THE LARGE FUNCTIONAL KIDNEY RESERVE, DESPITE A SIGNIFICANT DECLINE OF TOTAL GLOMERULAR FILTRATION
- ONLY THE MOST SEVERE CASES CAN BE DETECTED
 - MUCH MORE PROFUND EFFECTS IN PATIENTS WITH PREPROCEDURAL RENAL DYSFUNCTION AND LIMITED FUNCTIONAL RESERVE
 - ABNORMAL SERUM CREATININE IF 50% OF THE NEPHRON POPULATION IS DESTROYED (→HIGH RISK FOR PATIENT WHO HAS MID RENAL IMPAIRMENT)

RENAL ARTERY STENTING

RENAL FUNCTION DETERIORATION

**ATHEROEMBOLISM SEEMS TO PLAY AN
IMPORTANT ROLE**

DIFFICULT DIAGNOSIS

NO SPECIFIC TREATMENT

POOR PROGNOSIS

**PREVENTION WITH
PROTECTION DEVICES**

RENAL ARTERY ANGIOPLASTY RENAL ATHEROEMBOLISM

- **THE CONCEPT OF DISTAL PROTECTION SHOULD BE APPLIED TO RENAL ANGIOPLASTY AS TO OTHER ANGIOPLASTIES (CAROTID , CORONARY ARTERIES) TO AVOID SOME COMPLICATIONS**

RENAL ARTERY STENTING UNDER D.P.D.

RESULTS

DISTAL PROTECTION DURING RENAL ARTERY STENTING

POPULATION (1)

■ RENAL ANGIOPLASTIES AND STENTING :	129
■ PATIENTS :	110
➤ MALE :	75
➤ FEMALE :	35
➤ MEAN AGE :	64,4 ± 11,7 YEARS (22-87)
■ BILATERAL PROCEDURES :	18
■ 2 ARTERIES AT THE SAME SIDE :	1
■ POORLY CONTROLLED HYPERTENSION :	110/110
■ RENAL INSUFFICIENCY :	43/110
➤ MODERATE	27 (creatinine between 1.5 and 1.9 mg/dl)
➤ SEVERE	16 (creatinine ≥ 2 mg/dl)
■ SOLITARY/SINGLE FUNCTIONING KIDNEY :	10

(1 TRANSPLANT RENAL ARTERY)

DISTAL PROTECTION DURING RENAL ARTERY STENTING

POPULATION (2)

■ RISK FACTORS

➤ DIABETES	33/110
➤ SMOKING	77/110
➤ DYSLIPIDEMIA	69/110

■ ASSOCIATED DISEASES

➤ CORONARY DISEASES	77/110
➤ P.V.D.	38/110
➤ SUPRA AORTIC VESSEL DISEASES :	20/110

■ VERY DISEASED AORTA : 61 / 110

DISTAL PROTECTION DURING RENAL ARTERY STENTING TECHNIQUE

- FEMORAL APPROACH : 128/129
- BRACHIAL ACCESS : 1/129 (TOTAL OCCLUSION ILIAC ARTERIES)
- GUIDING CATHETER : 6F TO 8 F
- PREDILATATION : 28/129
- DIRECT STENTING : 101/129
- 132 STENTS IMPLANTED
 - AVE : 15
 - P154 : 6
 - NIR : 5
 - HERCULINK : 14
 - CORINTHIAN : 11
 - GENESIS : 34
 - CORDIS M3 : 2
 - STENTEC: 4
 - BIOTRONIK: 1
 - EXPRESS : 27
 - ABBOTT : 6
 - CARBOSTENT : 7
- MEAN ARTERIAL OCCLUSION TIME:(PERCUSURGE) 6.46 ± 2.42 mm (2.48 - 13.13 mm)
 - DIRECT STENTING : 5.02 ± 1.53 mm
 - SECONDARY STENTING : 7.57 ± 2.48 mm

} P < 0.015
- MEAN TIME IN SITU (FILTERS) : $4,22 \pm 1,18$ mm

DISTAL PROTECTION DURING RENAL ARTERY STENTING

PROTECTION DEVICES USED

■ PERCUSURGE :	46 PROCEDURES
■ EPI FILTER :	60 PROCEDURES
■ EMBOSHIELD	6 PROCEDURES
■ ANGIOGUARD :	11 PROCEDURES
■ FIBERNET® :	4 PROCEDURES
■ ACCUNET	2 PROCEDURES

DISTAL PROTECTION DURING RENAL ARTERY STENTING

IMMEDIATE RESULTS

■ TECHNICAL SUCCESS : 100 % (2 PREDILATIONS
REQUIRED TO CROSS A SUBOCCLUSIVE CALCIFIED
LESION)

■ PROCEDURAL SUCCESS : 100 %

■ MAJOR COMPLICATIONS : 0 %

■ ARTERIAL SPASM : 3/129 } FILTER : 2
PERCUSURGE : 1

DISTAL PROTECTION DURING RENAL ARTERY STENTING

FOLLOW UP (5)

RENAL FUNCTION

MEAN FOLLOW UP : 29,3 ± 13 MONTHS (2 – 98)

■ **ACUTE DETERIORATION : 1**

■ **AT 6 MONTHS :101 PATIENTS**

- **STABILIZATION: 75**
 - **IMPROVEMENT: 25**
 - **DETERIORATION: 1** (PATIENT WITH MODERATE RENAL INSUFFICIENCY)
- } 99%

■ **AT 2 YEARS : 84 PATIENTS**

- **STABILIZATION: 60**
 - **IMPROVEMENT: 20**
 - **DETERIORATION: 4 (5%)**
 - 1 PATIENT: BILATERAL ANGIOPLASTY, 1 WITHOUT PROTECTION
 - 3 PATIENTS WITH RENAL INSUFFICIENCY(1 MODERATE, 2 SEVERE)
- } 95%

R.A.S. UNDER PROTECTION

- **90 PATIENTS WITH ISCHEMIC NEPHROPATHY**
- **106 RENAL ARTERIES**
 - **MILD RENAL INSUFFICIENCY : 33 (37%)**
 - **MODERATE RENAL INSUFFICIENCY : 48 (53%)**
 - **SEVERE RENAL INSUFFICIENCY : 9 (10%)**
- **ANGIOGUARD :94 ARTERIES**
- **FILTERWIRE : 12 ARTERIES**

R.A.S. UNDER PROTECTION RESULTS

MEAN FOLLOW UP : 18,2 MONTHS (2-54 MONTHS)

- **IMPROVED RENAL FUNCTION : 36%**
- **STABILIZED : 55%**
- **PROGRESSIVE DECLINE : 8%**
- **ACUTE DETERIORATION : 1%**

R.A.S. UNDER PROTECTION

■ 32 R.A.S. WITH PERCUSURGE

➤ RENAL INSUFFICIENCY : 92%

■ 4 – 6 WEEK FOLLOW UP

➤ R.F. IMPROVEMENT : 50%

➤ R.F. UNCHANGED : 50%

➤ R.F. DETERIORATION : 0%

54% OF PATIENTS WITH R.F. DETERIORATION IMPROVED

■ CONCLUSION :

➤ R.A.S. UNDER PROTECTION IS A MARKED IMPROVEMENT IN SHORT TERM R.F. RESPONSE

➤ RESULTS ARE SIMILAR TO SURGICAL REVASCULARIZATION

➤ PROTECTION DEVICES MAY PREVENT R.F. HARM DURING R.A.S. AS A RESULT OF ATHEROEMBOLISM

R.A.S. UNDER D.P.D.

LIMITATIONS

R.A.S. UNDER D.P.D. CAPTURE EFFICIENCY

LIMITATIONS OF THE TECHNIQUE

■ EARLY BIFURCATION OF R.A.

COLLATERAL BRANCHES

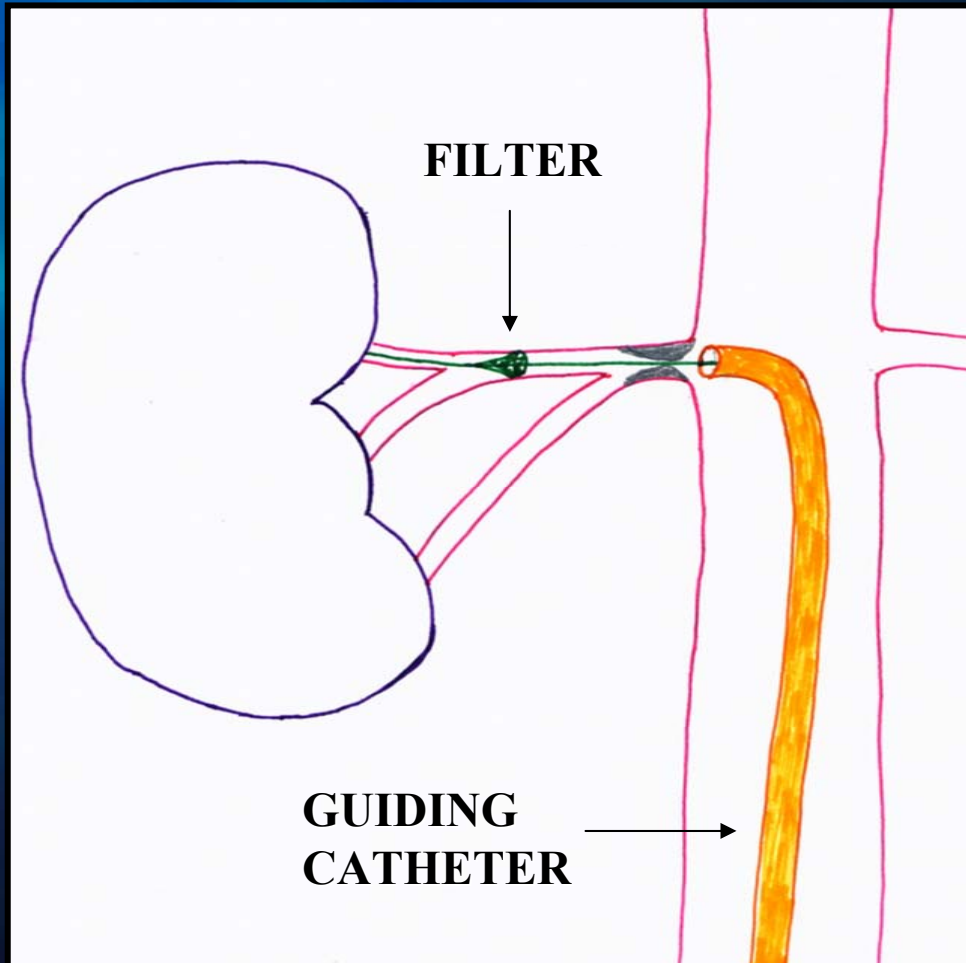
- D.P.D. IN THE MAIN BRANCH ?
 - ☛ RISK OF EMBOLISM IN THE NON PROTECTED BRANCH
- 2 D.P.D.?

10% OF THE CASES

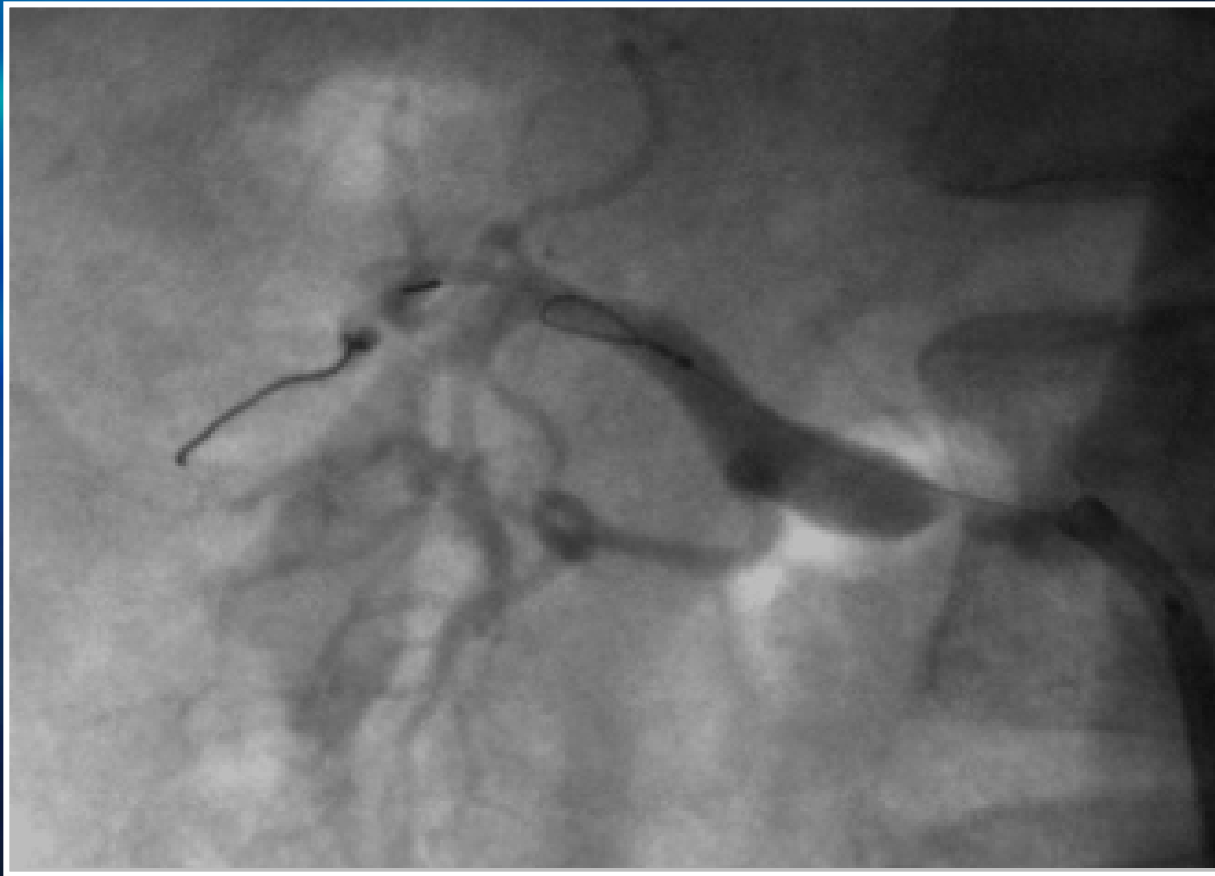
■ LARGE VESSELS : SELECT THE D.P.D.

- PERCUSURGE ☛ Ø 6/7 mm
- FILTERS ☛ Ø 7/8 mm

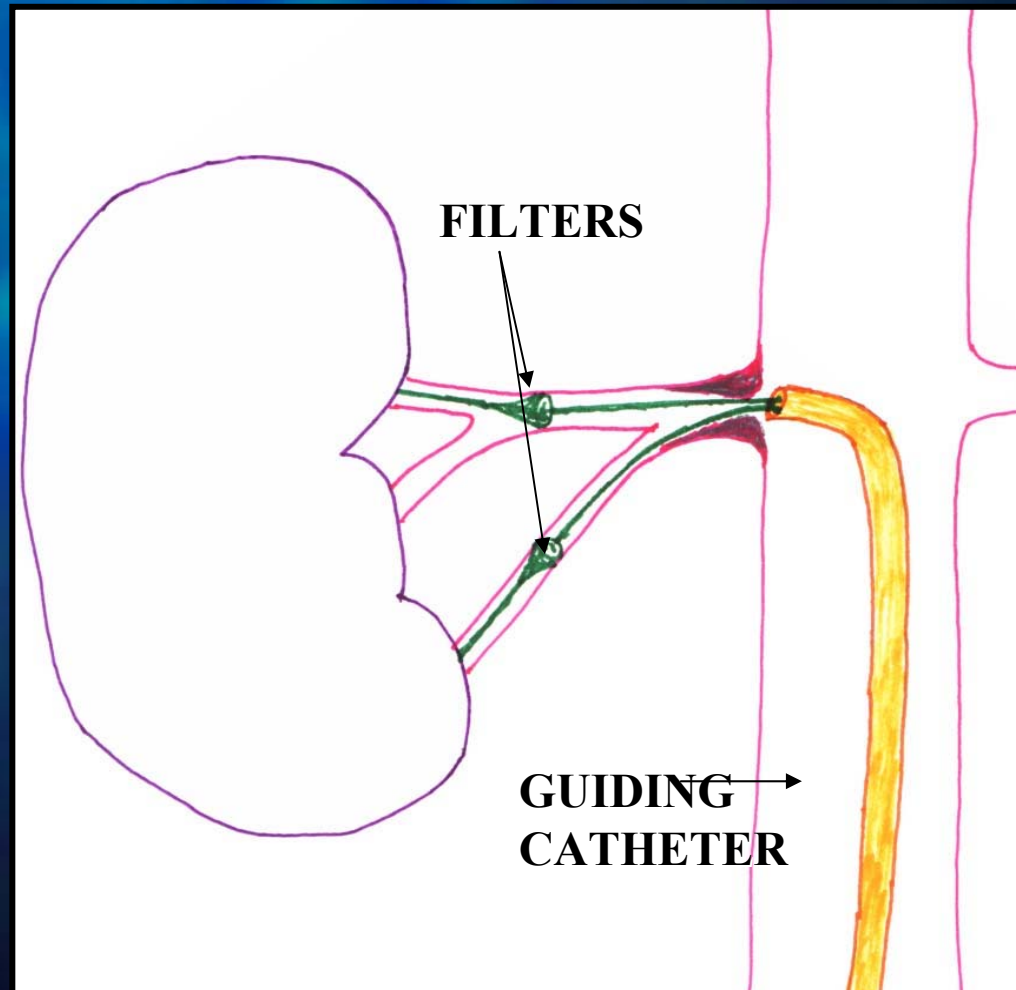
R.A.S. UNDER D.P.D. EARLY BIFURCATION



R.A.S. UNDER D.P.D. EARLY BIFURCATION



R.A.S. UNDER D.P.D. EARLY BIFURCATION



R.A.S. UNDER PROTECTION

LIMITATIONS OF CURRENT EPDs

FILTERS

- **PORE SIZE >100 μ ALLOW SMALLER PARTICLES THROUGH FILTER : OCCLUSION OF SMALL VESSELS / MICROINFARCTS**
- **NOT WELL APPOSED TO ARTERIAL WALL IN ECCENTRIC OR DISEASED LANDING ZONE**
- **RESTRICTIVE LANDING ZONE REQUIREMENTS**
- **FILTER CLOGGING REDUCES FLOW, MAKES IT DIFFICULT TO WITHDRAW**
- **POSSIBILITY OF DIFFICULTIES IN RETRIEVING FILTERS CAUGHT ON THE STRUTS OF THE STENT**

OCCLUSION BALLOON

- **POSSIBILITY OF DEFLATION**
- **PROBLEM OF WALL APPOSITION**
- **PROBLEM OF THE SHADOW ZONE**
- **KIDNEY ISCHEMIA IF OCCLUSION IS GREATER THAN 10 mn ?**

NEED FOR NEW PROTECTION DEVICE THAT OFFERS SIMPLICITY OF DELIVERY AND REMOVAL AND MORE EFFECTIVE EMBOLI ENTRAPMENT WHILE STILL PERMITTING DISTAL BLOOD FLOW

FIBERNET®

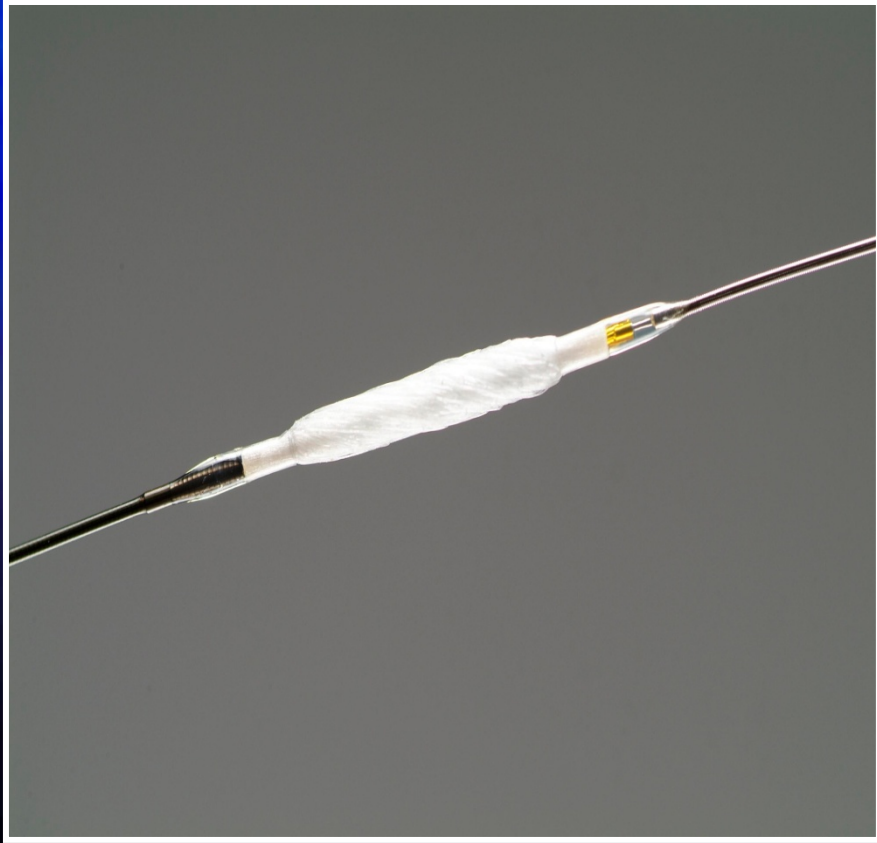
- FIBERNET® IS A NOVEL E.P.D. THAT INCORPORATES THE ABILITY TO ALLOW FLOW DURING THE PROCEDURE (FILTER), CAPABILITY TO CAPTURE SMALL PARTICLES (OCCLUSION BALLOON) AND IS DELIVERABLE AS A STANDARD CORONARY GUIDEWIRE



FIBERNET[®] E.P.D.

- **FIBER BASED FILTER**
- **UTILIZES A MESH OF 150 - 600 PET FIBERS TO CAPTURE EMBOLIC PARTICLES IN A “3DIMENSIONAL FILTER”**
- **FIBERS INCORPORATED ON A HIGH PERFORMANCE .014”CORONARY GUIDEWIRE (190cm) WITH A SHAPEABLE TIP**
- **DOES NOT REQUIRE A DELIVERY SHEATH FOR DELIVERY DEPLOYMENT**

FIBERNET[®]



FIBERNET[®] E.P.D.

- **AVAILABLE IN 5 SIZES FOR VESSELS 1,75 - 7.0 mm IN DIAMETER**
- **LOW CROSSING PROFILE (1.7 -3.1F)**

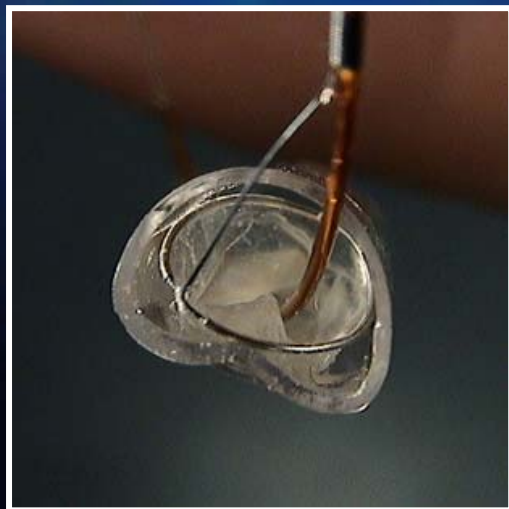
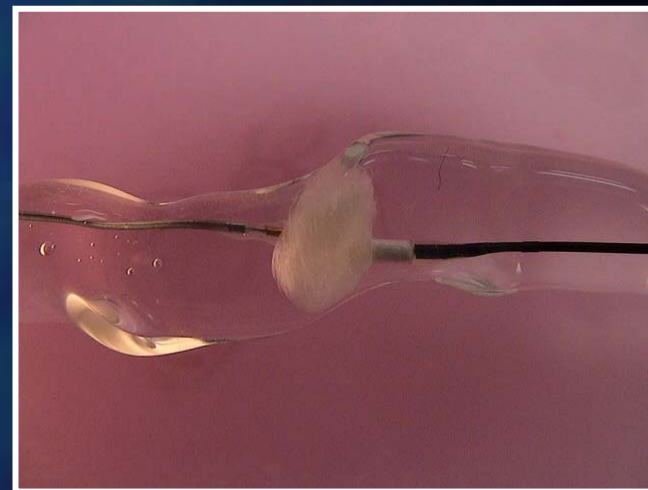
FIBERNET[®] E.P.D.

- GOOD VESSEL WALL APPOSITION

VESSEL WALL APPOSITION



FIBERNET®



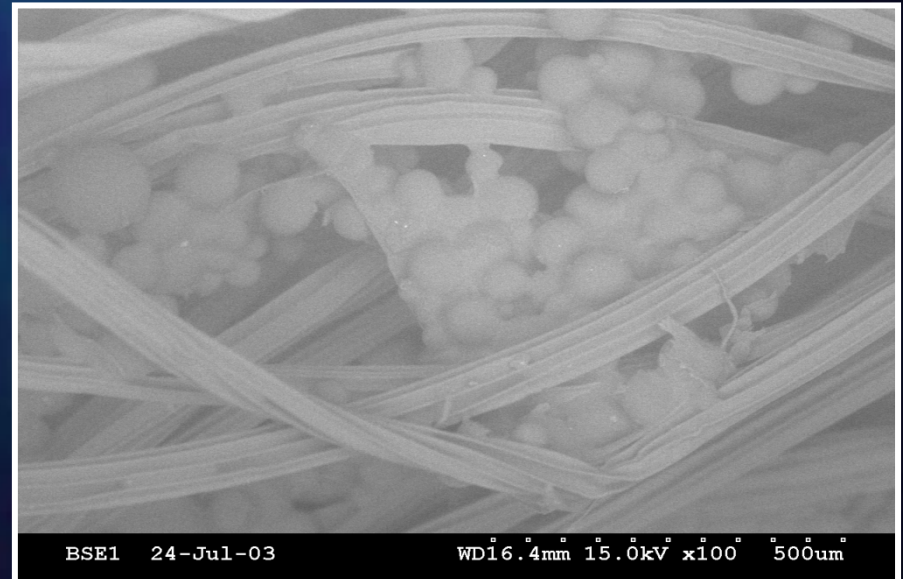
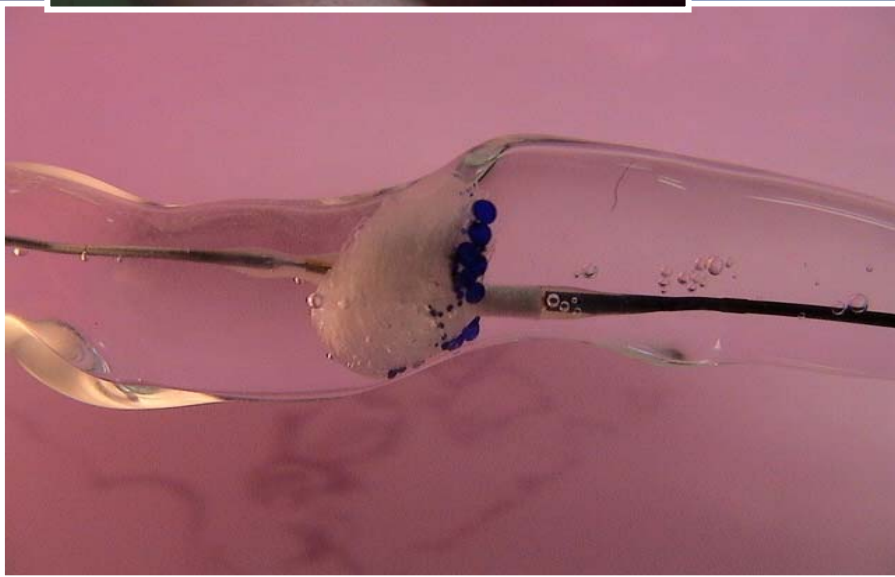
FILTERWIRE EZ™



FIBERNET®



**EMBOLIC PROTECTION
PARTICLE ENTRAPMENT**



FIBERNET[®]

RETRIEVAL CATHETER



FIBERNET[®] E.P.D.

- **RETRIEVAL CATHETER ALLOWS FOCAL SUCTION DURING DEVICE REMOVAL**
- **ASPIRATION IS ACHIEVED THROUGH THE RETRIEVAL CATHETER USING VACUUM SYRINGES TO PROVIDE SUCTION**
- **CONTAINED AND CAPTURED EMBOLI ARE RECOVERED/REMOVED PRIMARELY BY ASPIRATION THROUGH THE RETRIEVAL CATHETER BUT ALSO BY RETENTION WITHIN THE FILTER FIBERS WHEN THE FILTER IS CLOSED AND RETRACTED INTO THE RETRIEVAL CATHETER**
- **ABILITY TO USE THE RETRIEVAL CATHETER TO ASPIRATE WITHIN THE STENT PRIOR TO FILTER RETRIEVAL**

FIBERNET[®] E.P.D.

- **RETRIEVAL CATHETER ALLOWS CAPTURE OF EMBOLI AS LOW AS 30/40 MICRONS WHILE MAINTAINING BLOOD FLOW DURING PROCEDURE.**

FIBERNET[®] E.P.D.

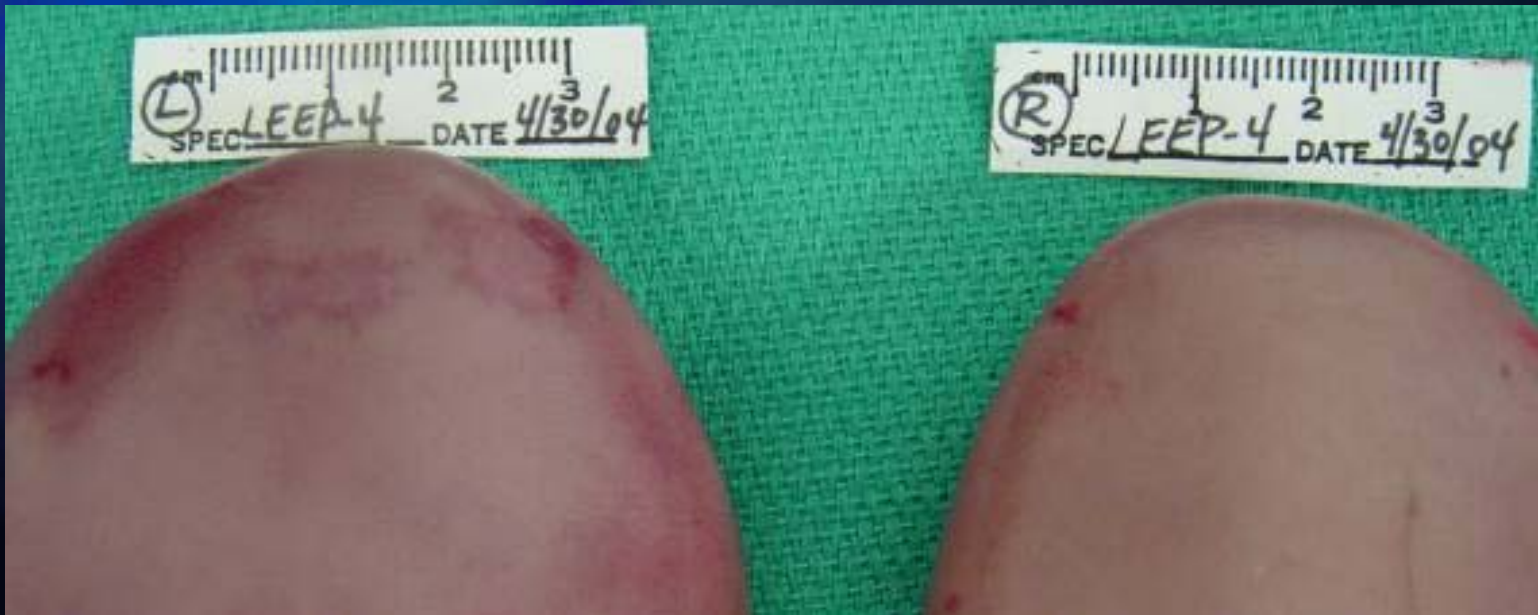
■ 3 ASPIRATIONS ARE DONE :

- INSIDE THE STENT**
- BETWEEN STENT AND FILTER**
- WHEN FILTER IS COLLASPED AND RETRACTED INTO THE RETRIEVAL CATHETER**

RENAL ARTERY STENTING ATHEROEMBOLISM

POSITIVE BIO-TEST FOR EMBOLISM

- PORCINE MODEL
- 2x SAFER QUANTITY AND SIZE OF P.V.A. PARTICLES INJECTED
- LEFT KIDNEY UNPROTECTED ; RIGHT KIDNEY PROTECTED WITH FIBERNET
- 4 HOUR PERFUSION



RENAL RESULTS

■ RENAL PATIENTS : 4 SUBJECTS

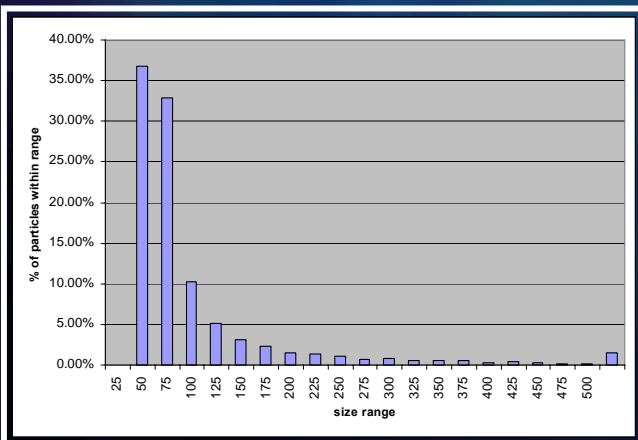
➤ **PROCEDURE SUCCESS** 100% (4/4)

➤ **%VISIBLE DEBRIS CAUGHT** 100% (4/4)

AVERAGE SURFACE AREA FOR DEBRIS : 117.1 mm²

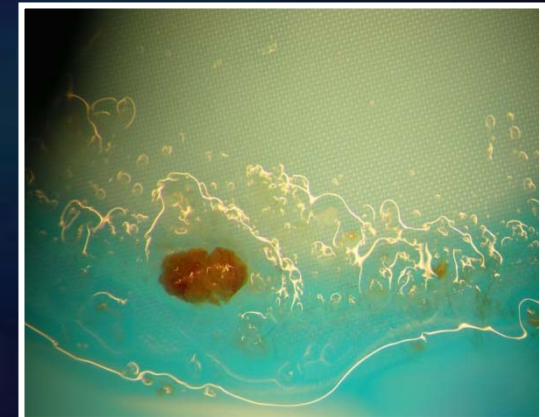
➤ **DEBRIS ANALYSIS : PARTICULES OF LESS THAN 40 MICRONS CAN BE REMOVED**

➤ **ATHEROMATOUS MATERIAL FOUND IN BOTH ASPIRATE AND FILTER SAMPLES (65 % IN ASPIRATE SAMPLES)**



➤ **DEATH : 0 %**

➤ **SERIOUS ADVERSE
EVENTS : 0 %**



CLINICAL STUDY DEBRIS ANALYSIS (UNIVERSITY OF MINNESOTA)

	FIBERNET®	OTHER EPD*
Nbr	34	14
VISIBLE DEBRIS	100 %	43 %
MEAN PARTICLE SIZE	28 TO 6839μ	28 TO 5302μ
NUMBER OF PARTICLES <100μ	4976	2752
MEAN SURFACE AREA	63,8 mm²	12,2 mm²

* FILTERWIRE EZ:6 , ACCUNET:6 , EMBOSHEALD:1 , ANGIOGUARD:1

**CLINICAL STUDY DEBRIS ANALYSIS
(UNIVERSITY OF MINNESOTA)**

- **DEBRIS REMOVED WITH FIBERNET[®]:
5 TIMES MORE**
- **30% OF EMBOLI WAS ASPIRATED WITHIN
THE STENT WITH THE FIRST SYRINGE**

FIBERNET[®] E.P.D.

■ ADVANTAGES

- EASY TO USE AND TO PLACE EVEN IN ANGULATED RENAL ARTERY**
- NO PREDILATATION REQUIRED AS IN C.A.S.**
- SHORT LANDING ZONE REQUIRED**

DISTAL PROTECTION DURING RENAL ARTERY STENTING

INDICATIONS

■ ALL ATHEROMATOUS PATIENTS ?

MAYBE THE FUTURE

■ SELECTIVE INDICATIONS AT LEAST

- ELDERLY PATIENTS**
- PATIENTS WITH RENAL INSUFFICIENCY :
CREATININE > 1.4 mg %**
- ISCHAEMIC NEPHROPATHY PATIENT GROUP**
- BILATERAL RENAL STENOSIS**
- SOLITARY OR SINGLE FUNCTIONING KIDNEY**
- DISEASED AORTA AND RENAL OSTIA**
- DIABETICS ?**

RENAL ARTERY STENTING

CONCLUSIONS

- R.A.S. IS WIDELY PERFORMED, GIVING EXCELLENT IMMEDIATE TECHNICAL SUCCESS, GOOD LONG TERM PATENCY , BUT DETERIORATION OF RENAL FUNCTION AFTER R.A.S. IS A CONCERN (20 – 30 % OF THE CASES) AND LIMITS THE IMMEDIATE BENEFITS OF THE PROCEDURE
- ATHEROEMBOLISM SEEMS TO PLAY AN IMPORTANT ROLE
- RENAL PROTECTION IS A NEW APPROACH TO IMPROVE THE RESULTS OF R.A.S. AND IS NOT MERELY PARTICULATE RETRIEVAL.
- OUR RESULTS SHOW THE SAFETY AND EFFICIENCY OF THIS PROCEDURE
- BUT THIS TECHNIQUE HAS SOME LIMITATIONS (TECHNICAL PROBLEMS, COST....) AND HAS TO BE IMPROVED
- THE NEW FILTER FIBERNET® SEEMS PROMISING
- INDICATIONS SHOULD BE DEFINED
- RANDOMIZED STUDIES ARE AWAITED