

Endovascular Hydrodynamic Thrombectomy Of Occluded Visceral Vessels/Stents: Device Description And Clinical Experience

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Disclosures

- No disclosures for this presentation

Background

- Incidence of acute mesenteric ischemia (AMI) or acute renal artery occlusion (RAO) is low 0.09-0.2% respectively, and 0.007% of all acute emergency department admissions
- If not treated properly and promptly mortality rates exceed 50%
- Traditionally, AMI has been treated with open surgery and the management of acute RAO is limited, based primarily on case reports and small series.
- However, endovascular interventions show apparent advantages such as lower mortality and bowel resection rates

AMI and Mortality

Months	Patients at risk
0	40
12	5
24	4
36	2

• Fedoroff F, Schönau K, Schulz-Hagen M, Keil S, Isfort P, Gombert A, Alhaj PH, Kuhl CK, Brunen P, Zimmermann M. Endovascular Revascularization with Stent Implantation in Patients With Acute Mesenteric Ischemia due to Acute Arterial Thrombosis: Clinical Outcome and Predictive Factors. *Cardiovasc Intervent Radiol*. 2021 Jul;44(7):1030-1038.

Background and Aim

- One of the options for endovascular procedures today is the use of the AngioJet rheolytic thrombectomy system. This system is designed to remove thrombi using the Venturi-Bernoulli effect.
- In this study, we evaluated the endovascular treatment of renal/visceral ischemia with the Angio Jet™ rheolytic thrombectomy (Boston Scientific, Marlborough, USA) to save the organ/life of the patient

Materials and Methods

- This is a retrospective study of patients who underwent revascularization from March 2013 to July 2024
- Clinical, laboratory and imaging findings were collected
- Patients treated with other endovascular thrombectomy devices and in other vascular districts were excluded from this study.
- Laboratory markers of renal function, including preoperative and discharge levels of eGFR, and lactate dehydrogenase, were appraised. Blood samples were collected both pre- and post-intervention

Endpoints

Primary Endpoints

- Technical success defined as patency of the targeted artery following the procedure.
- Clinical success was determined by enhancements in the patient's overall condition, alleviation of pain, and normalization of organ related laboratory findings.

Secondary endpoints


- major cardiovascular and cerebrovascular events, access site complications, duration of hospital stay, and target organ damage, such as bowel resection or persistent renal insufficiency.

The Procedure

- The procedures were conducted under general anaesthesia or local anaesthesia.
- Vascular access was obtained through the left axillary artery or left brachial artery through puncture or surgical cut-down.
- Heparinization was performed with 5000 I.u.
- Aspiration thrombectomy was carried out using a 6 F AngioJet™ catheter system.
- The system was loaded with 5000 ml saline solution with 10000 I.u. Heparin and 20 mg Actilyse.

The Device

- It involves introducing multiple jets of saline solution at high speed and high pressure through openings in the distal tip of the catheter to create a localized low-pressure area that results in a vacuum effect with the entrainment and dissociation of thrombus.



Courtesy of Boston Scientific

Results

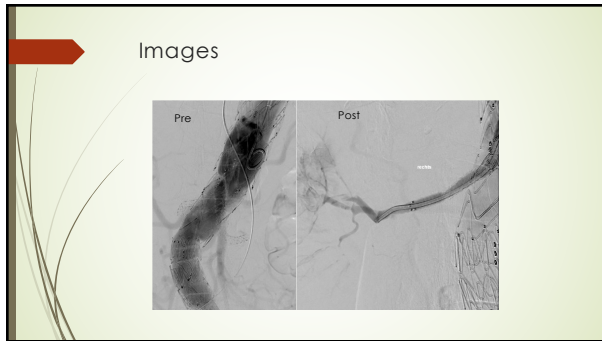
	Endpoint			Total
	Successful	Partially Successful	Failure	
N (%)	12 (67)	4 (22)	2 (11)	18 (100)
Age, mean (SD, min-max)	72.17 (±10.6, 49-86)	58.5 (±7.5, 51-69)	64.5 (±14.9, 54-75)	68.3 (±11.4, 49-86)
Sex, male n (%)	10 (83)	2 (50)	1 (50)	13 (72)
Risk Factor, n (%)				
Hypertension	12 (100)	4 (100)	2 (100)	18 (100)
DM Type II	3 (25)	2 (50)	1 (50)	6 (33)
Coronary artery disease	5 (42)	2 (50)	1 (50)	8 (44)
Peripheral artery disease	2 (17)	2 (25)	0 (0)	4 (22)
Transient ischemic attack	1 (8)	0 (0)	1 (50)	2 (11)
Atrial fibrillation	2 (17)	0 (0)	0 (0)	2 (11)
Post-BEVAR or stent implantation	10 (83)	1 (25)	0 (0)	11 (61)
Renal artery aneurysm	1 (8)	0 (0)	0 (0)	1 (5)
Blood disorder	2 (17)	0 (0)	0 (0)	2 (11)

Intraoperative Data

	Endpoint				Total
	SMA	LRA	BIA	(all SMA)	
Target vessel, N (%)	4 (22)	7 (39)	1 (6)	4 (22)	18 (100)
Arterial access, n (%)					
LAA, cut-down	2 (50)	5 (72)	1 (100)	1 (25)	11 (61)
LRA, cut-down	0 (0)	1 (14)	0 (0)	1 (25)	2 (11)
LRA, puncture	2 (50)	1 (14)	0 (0)	2 (50)	5 (28)
Type of anaesthesia, n (%)					
General anaesthesia	3 (75)	5 (72)	1 (100)	2 (50)	13 (72)
Local anaesthetic	1 (25)	2 (28)	0 (0)	2 (50)	5 (28)
Lysis therapy, n (%)	0 (0)	3 (43)	0 (0)	1 (25)	4 (22)
Radiation time (minutes), mean (SD, min-max)	39.45 (111.71, 28.9-53.4)	34.61 (113.99, 26.6-65.6)	n/A	50.84 (129.34, 30.5-93.3)	38.88 (14.24, 25-31) (117.36, 25-93.3)
Radiation dose (mSv), mean (SD, min-max)	1681.75 (1417.33, 205.3-2446)	1488.29 (1383.04, 786.18-62)	n/A	5622.75 (13507.08, 1057.82-21)	3998 (13173.5, 1754.4-642) (786.57-7)
Amount of contrast agent (ml), mean (SD, min-max)	543 (163.41, 99-209)	98.57 (146.67, 35-145)	n/A	187.5 (163.89, 125-233)	127.5 (160.1, 85-170) (128.55 (168.75, 35-233))

Biomarker Results

	Endpoint				Total
	SMA	LRA	BIA	(all SMA)	
LDH					
Pre-Op (U/L)	262	435	768	417.83	560.5
mean (SD, min-max)	(137.54, 240-306)	(141.64, 108-313)	n/A	(169.78, 345-522)	(154.35, 177-977)
By discharge (U/L)	327.5	519.42	1439	583.75	499.5
mean (SD, min-max)	(195.89, 207-411)	(1330.03, 249-1233)	n/A	(1387.06, 149-1049)	(1345.78, 255-744) (1364.01, 149-1439)
edRf (ml/min/1.73m ²)					
Pre-Op	65.75	42.29	11	70.25	67.5
mean (SD, min-max)	(126.06, 34-96)	(123.46, 15-81)	n/A	(129.4, 40-106)	(16.36, 63-72)
By discharge	51	48.71	11	60	70.5
mean (SD, min-max)	(116.53, 38-74)	(124.16, 25-97)	n/A	(133.08, 29-109)	(45.96, 38-103) (126.64, 21-109)
CK (U/L)					
Pre-Op				229.21	1203
mean (SD, min-max)				(130.51, 24-746)	(1164.14, 93-2367)
By discharge	102 (158.87, 33-170)	Not checked		42.5	59.7
mean (SD, min-max)				(136.01, 19-107)	(123.12, 19-60) (131.73, 19-115)



Discussion and Conclusion

- The procedure was successful in twelve cases, resulting in the patients being discharged with patent target arteries.
- Four patients required re-intervention, while two cases ended with a fatal complication.
- This study suggests that this method may be a reliable and minimally invasive treatment option for both acute and sub-acute occlusive lesions in visceral arteries
- Larger cohorts, ideally multicentric data, would be needed to confirm this data

International Angiology
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The Rheolytic Thrombectomy AngioJet™ is a safe and technically feasible method for treating acute and sub-acute occluding lesions in the visceral arteries.

Thank You

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