

EBM report

The treatment of Mycotic aneurysm of
infrarenal aorta and iliac artery

Reporter: Hsin Yu

Supervisor: Dr. 陳偉華

Patient profile

- ⦿ Gender: male
- ⦿ Age: 67 year-old
- ⦿ Admission period:
 - from 2007/10/25 ~ now
- ⦿ Chief: intermittent fever up to 39[^]C
 - Underline
 - DM(+): for 10+years under insulin (mixtard 60/28u sc bidac) regular control. <A1C: 7.6% on 96-9-17.>
 - Lt. knee chronic ulcer for more than 10 years after car accident
 - HTN under Hyzaar 0.5# QD

2006/3/15

|

2006/4/8

Brief history

2006/3/15

Intermittent fever, dysuria for more than 8 days

2006/3/17

B/C, U/C: salmonella group B

2006/3/23

2007/3/23 CT: mycotic aneurysm of Rt. common iliac artery

Dx. Right common iliac artery mycotic pseudoaneurysm due to salmonella group B infection,

2006/3/24

aortobifemoral in situ reconstruction with 14mm-7mm-7mm Y-vascular graft

Antibiotic with Rocephine for 22 days

2007/4/30

|

2007/5/16

Intermittent fever (40°C),

2007/4/30 sona, CT: mycotic aneurysm

Low abdominal wall abscess.

Right common iliac artery mycotic aneurysm, s/p op.

Dx. Abdominal wall abscess,

Cefotaxime for 11

Blood culture x 2: Salmonella group B B-streptococci group G

Pus culture 1) B-streptococci group G 2) Peptostreptococcus magnus

2007/9/17

|

2007/10/9

Fever, chills, 3x2 cm wound grade 3 without discharge

2007/9/17 CT:

1. Right common iliac artery mycotic aneurysm, s/p op.
2. Thrombosis of left common iliac a with bypass graft to left CFA

Septicaemia, B/C x 2套 showed B-streptococci group G

Antibiotic with Rocephine, Vancomycin, penicillin G

2007/10/25

|

now

Intermittent fever up to 39°C,

2007/10/7 CT: mycotic aneurysm

Right common iliac artery mycotic aneurysm, s/p op. Small low attenuation lesion is seen around the anastomosis. R/O residual abscess.

Re infection or not? Keep antibiotic treat for 6 wks and observation

2007/11/16

Sepsis (fever, hypotension)

2007/11/19

11/19 operation: Abdominal aortic grafting, Femorofemoral bypass, Adhesiolysis with duodenum and jujenum repair

Much perigraft abscess formation with extension to right iliac limb

Wound and pus culture: E.coli

Cefmetazole x 15 days then Piperacillin/Tazobactam 10 days

2006/3/23

93
Ac: 902
Ex: 902
Se: 3
Im: 93
DFOV: 39.6 cm
SN -444.5

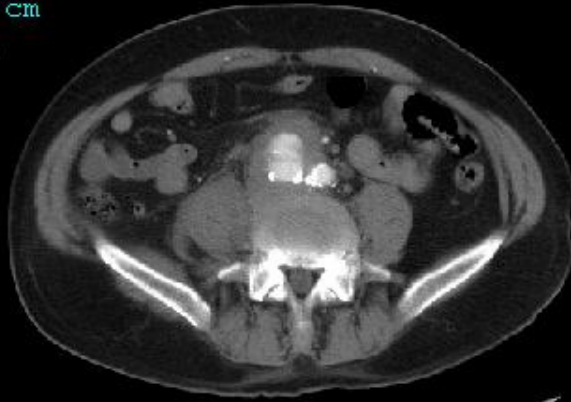
CT02_OC0-LightSpeed VCT 94

徐福旗

066Y N102763146 Ex: 902
2006032300 Se: 3
15230200 Im: 94

DFOV: 39.6 cm
SN -449.5

QP: 0C
30
60
90
131.2
mm



15282200
kV: 120
mA: 314
ST: 5.000000 mm
Contrast:

P

W450/L80

95
Ac: 902
Ex: 902
Se: 3
Im: 95
DFOV: 39.6 cm
SN -454.5

CT02_OC0-LightSpeed VCT 96

徐福旗

066Y N102763146 Ex: 902
2006032300 Se: 3
15230200 Im: 96

DFOV: 39.6 cm
SN -459.5

QP: 0C
30
60
90
131.2
mm



15282200
kV: 120
mA: 310

L

CT02_OC0-LightSpeed VCT

徐福旗

066Y N102763146 Ex: 902
2006032300 Se: 3
15230200 Im: 94

DFOV: 39.6 cm
SN -449.5

QP: 0C
30
60
90
131.2
mm



15282200
kV: 120
mA: 311
ST: 5.000000 mm
Contrast:

P

W450/L80

96
Ac: 902
Ex: 902
Se: 3
Im: 96
DFOV: 39.6 cm
SN -459.5

CT02_OC0-LightSpeed VCT

徐福旗

066Y N102763146 Ex: 902
2006032300 Se: 3
15230200 Im: 96

DFOV: 39.6 cm
SN -459.5

QP: 0C
30
60
90
131.2
mm



15282200
kV: 120
mA: 308

L

2007/04/30

122
Ac:7603
Ex:7603
Se:3
Im:122
DFOV:40.4 cm
SN -548.75
OP:U

CT02_OC0-LightSpeed VCT
徐福旗
067Y N102763146
20070430□□
200844□□

0
30
60
90
134.3
mm



201903□□
kV:120
mA:400
37.5 000000 mm

L

2007/04/30

95
Ac: 7603
Ex: 7603
Se: 3
Im: 95
DFOV: 40.4 cm
SN -413.75

CT02_OC0-LightSpeed VCT 96
徐福旗
067Y N102763146
2007043000
20084400

CT02_OC0-LightSpeed VCT
徐福旗
067Y N102763146
2007043000
20084400

OP: U
30
60
90
133.9
mm

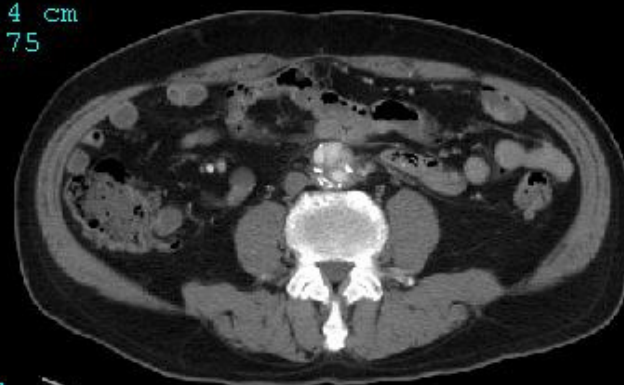


20190300
kV: 120
mA: 400
ST: 5.000000 mm
Contrast: O-100

P

W450/L80

OP: U
30
60
90
133.9
mm



20190300
kV: 120
mA: 400
ST: 5.000000 mm
Contrast: O-100

P

W450/L80

97
Ac: 7603
Ex: 7603
Se: 3
Im: 97
DFOV: 40.4 cm
SN -423.75

CT02_OC0-LightSpeed VCT 98
徐福旗
067Y N102763146
2007043000
20084400

CT02_OC0-LightSpeed VCT
徐福旗
067Y N102763146
2007043000
20084400

OP: U
30
60
90
133.9
mm



20190300
kV: 120
mA: 400

OP: U
30
60
90
133.9
mm



20190300
kV: 120
mA: 400

2007/04/30

99
Ac:7603
Ex:7603
Se:3
Im:99
DFOV:40.4 cm
SN -433.75

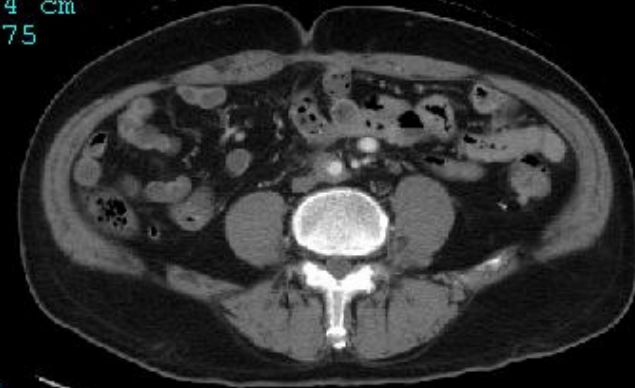
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徐福旗 Ac:7603
067Y N102763146 Ex:7603
2007043000 Se:3
20084400 Im:100

CT02_OC0-LightSpeed VCT
徐福旗
067Y N102763146
2007043000
20084400

OP:0U
30
60
90
133.9
mm



L
30
60
90
133.9
mm



20190300
kV:120
mA:400
ST:5.000000 mm
Contrast:0-100

P

W450/L80 Contrast:0-100

P

W450/L80

101
Ac:7603
Ex:7603
Se:3
Im:101
DFOV:40.4 cm
SN -443.75

CT02_OC0-LightSpeed VCT 102
徐福旗 Ac:7603
067Y N102763146 Ex:7603
2007043000 Se:3
20084400 Im:102

CT02_OC0-LightSpeed VCT
徐福旗
067Y N102763146
2007043000
20084400

OP:0U
30
60
90
133.9
mm



L
30
60
90
133.9
mm



20190300
kV:120
mA:400

20190300
kV:120
mA:400

2007/04/30

103
Ac:7603
Ex:7603
Se:3
Im:103
DFOV:40.4 cm
SN -453.75

CT02_OC0-LightSpeed VCT 104
徐福旗 Ac:7603
067Y N102763146 Ex:7603
2007043000 Se:3
20084400 Im:104

CT02_OC0-LightSpeed VCT
徐福旗
067Y N102763146
2007043000
20084400

QP:0U
30
60
90
133.9
mm



20190300
kV:120
mA:400
ST:5.000000 mm
Contrast:O-100

P

W450/L80 Contrast:O-100

QP:0U
30
60
90
133.9
mm



20190300
kV:120
mA:400
ST:5.000000 mm
Contrast:O-100

P

W450/L80

105
Ac:7603
Ex:7603
Se:3
Im:105
DFOV:40.4 cm
SN -463.75

CT02_OC0-LightSpeed VCT 106
徐福旗 Ac:7603
067Y N102763146 Ex:7603
2007043000 Se:3
20084400 Im:106

CT02_OC0-LightSpeed VCT
徐福旗
067Y N102763146
2007043000
20084400

QP:0U
30
60
90
133.9
mm

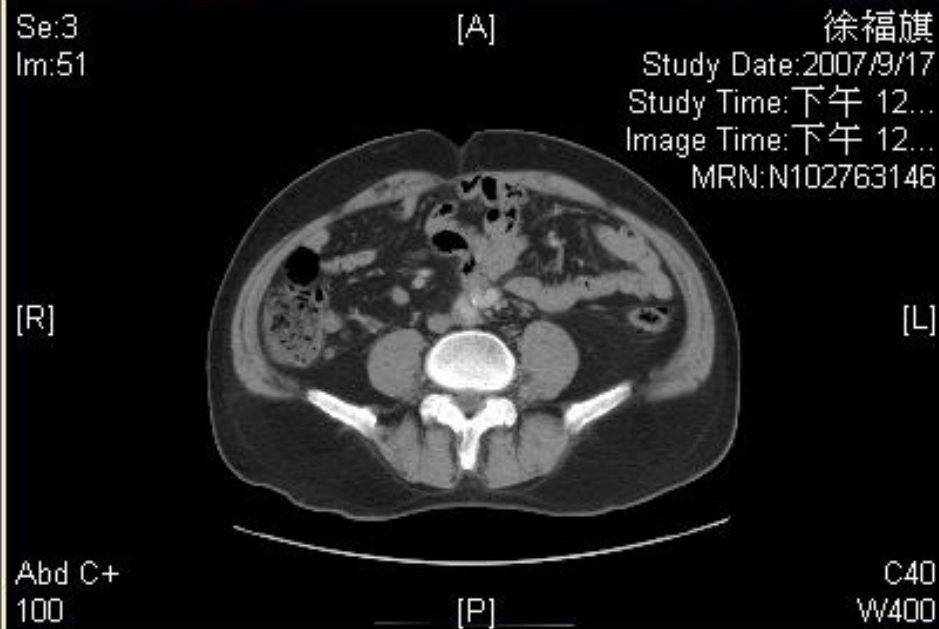


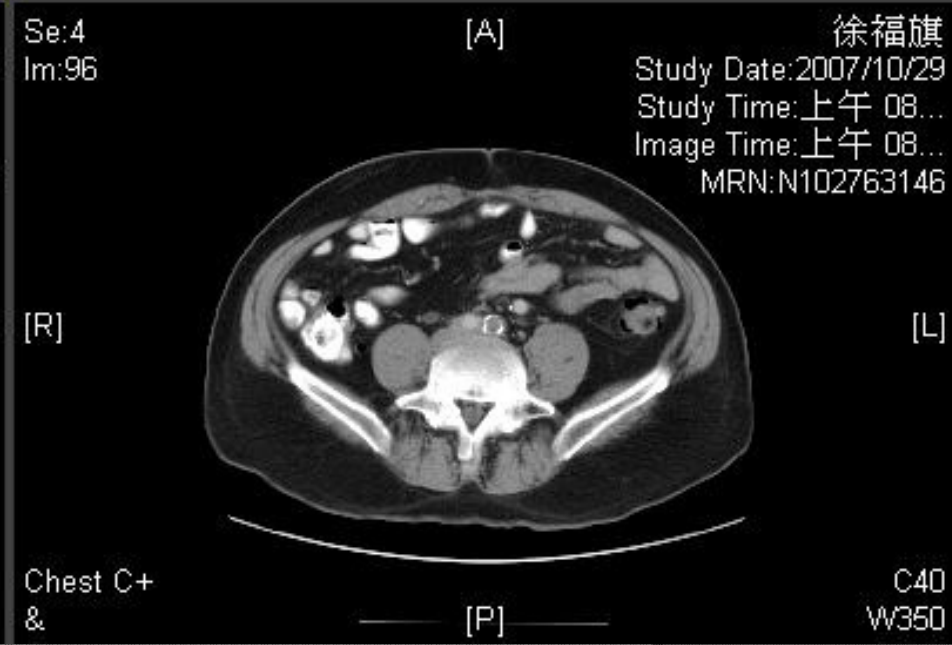
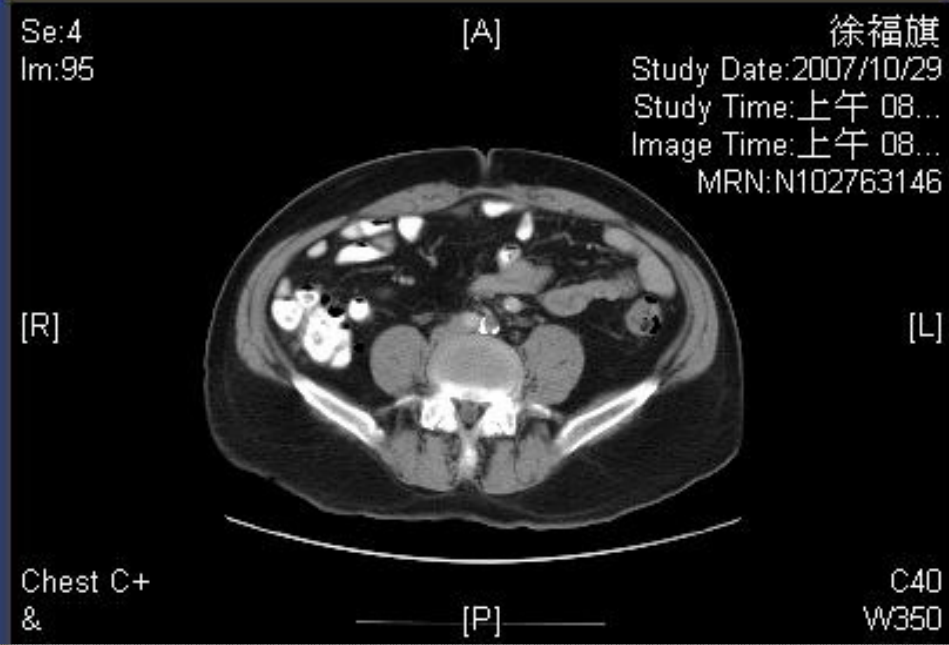
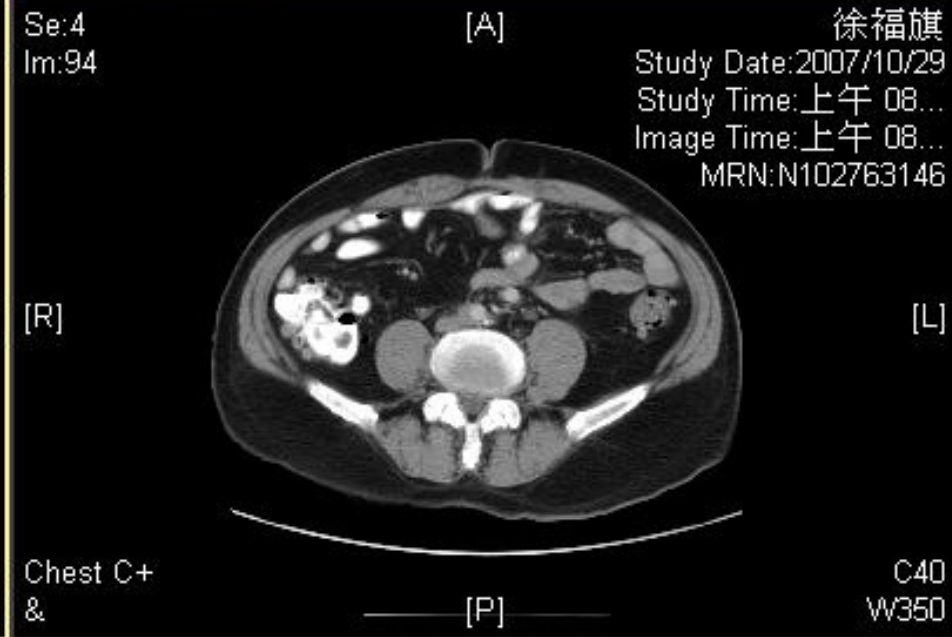
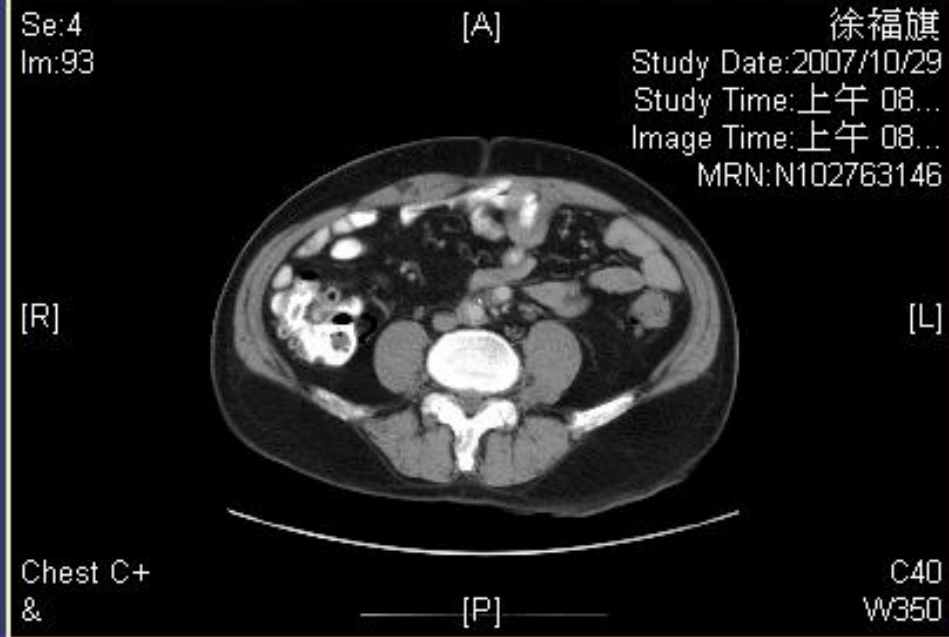
20190300
kV:120
mA:400

QP:0U
30
60
90
133.9
mm



20190300
kV:120
mA:400





Diagnosis

- ⦿ Reinfection of previous mycotic aneurysm s/p in situ reconstruction, E. coli infection

Conventional treatment

from Schwartz

- ⊙ If visceral aortic area:
 - débridement and in situ reconstruction
 - Cryopreserved aorta
 - artificial one (Expanded polytetrafluoroethylene (ePTFE) grafts, Dacron grafts)
- ⊙ Infra-renal aortic area and iliac artery
 - extra-anatomic approach (axillobifemoral bypass),
- ⊙ Other procedures
 - Arterial ligation: radial, brachial, external iliac and deep femoral

PICO

Patient / Problem	Mycotic aneurysm of infrarenal aortic area and iliac artery
Intervention	In situ reconstruction
Comparison, if any	Conventional therapy: Extra anatomic reconstruction
Outcome	Re-infection rate Mortality

Strategy for search

- ⦿ Database : pubmed
- ⦿ Key words:
 - Mycotic aneurysm
 - In situ repair, in situ reconstruction
 - Extra anatomic reconstruction
- ⦿ Limited: human, English



Limits: **Humans, English**

- Search History will be lost after eight hours of inactivity.
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- To combine searches use #search, e.g., #2 AND #3 or click query # for more options.

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#7	Search #1 AND #4 Limits: Humans, English	21:32:57	25
#6	Search #1 AND #3 Limits: Humans, English	21:32:42	36
#5	Search #1 AND #2 Limits: Humans, English	21:32:36	45
#4	Search extra anatomic reconstruction Limits: Humans, English	21:31:51	164
#3	Search in situ repair Limits: Humans, English	21:31:26	1702
#2	Search in situ reconstruction Limits: Humans, English	21:31:16	852
#1	Search mycotic aneurysm Limits: Humans, English	21:31:03	1701

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Mycotic aneurysms of the thoracic and abdominal aorta and iliac arteries: Experience with anatomic and extra-anatomic repair in 33 cases

Barbara Theresia Müller, MD,^a Otto Ruano Wegener, MD,^a Klaus Grabitz, MD,^a Michael Pillny, MD,^a Lutz Thomas, MD,^b and Wilhelm Sandmann, MD,^a *Düsseldorf, Germany*

JOURNAL OF VASCULAR SURGERY
January 2001

Purpose

- ◎ **Progress of mycotic aneurysm in a single center over a long time period (18 years) through use of surgical techniques and antiseptic adjuncts.**

Material and method

- From 1983/1~1999/12,
- Aneurysm of thoracic, abdomen aorta and iliac artery: 2520 people, 33 of them are mycotic aneurysm (1.31%)
- N=33

Table II. Location of mycotic aneurysm

<i>Location</i>	<i>No. of patients</i>	<i>%</i>
Iliac artery	6	18.2
Aorta abdominal	14	42.4
Infrarenal	10	
Suprarenal	4	
Aorta thoracoabdominal	13	39.4
TAA I	4	
TAA II	1	
TAA III	1	
TAA IV	7	

Table III. Number of perioperative deaths in relation to status of perforation

<i>Status of perforation</i>	<i>No. of patients (%)</i>	<i>No. of perioperative deaths (%)</i>
Rupture	8 (24)	5 (63)
Free	3	2
Into retroperitoneum	2	2
Into other organs	3	1
Contained rupture (pseudoaneurysmal)	20 (61)	7 (35)
Intact	5 (15)	0 (0)
Totals	33 (100)	12 (36)

Table IV. Location of mycotic aneurysm, surgical management, and relation to perioperative mortality

Location	All patients/		Extra-anatomic/		In situ			
	No. of peri-operative deaths	Mortality (%)	No. of peri-operative deaths	Mortality (%)	Tubular graft/		Patch/	
					No. of peri-operative deaths	Mortality (%)	No. of peri-operative deaths	Mortality (%)
Iliac artery	6/2	33	3/2	67	3/0	0	—	—
Aorta: abdominal	14/5	36	5/2	40	9/3	33	—	—
Infrarenal	10/5	50	5/2	40	5/3	60	—	—
Suprarenal*	4/0	0	—	—	4/0	0	—	—
Aorta: thoracoabdominal†	13/5	38	—	—	9/3	33	4/2	50
TAA IV*	7/1	14	—	—	5/0	0	2/1	50
TAA III	1/0	0	—	—	—	—	1/0	0
TAA II*	1/1	100	—	—	1/1	100	—	—
TAA I	4/3	75	—	—	3/2	67	1/1	100
Subtotals	—	—	—	—	21/6	29	4/2	50
Totals	33/12	(36%)	8/4	(50%)	25/8		(32%)	

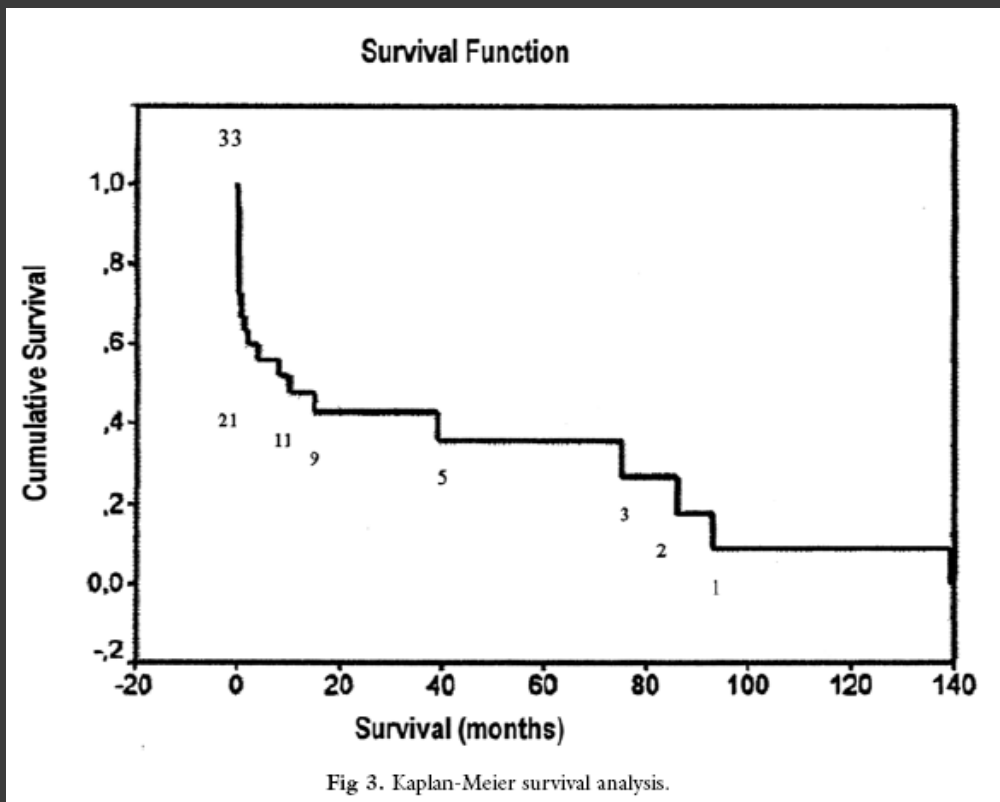
*In nine cases, visceral and/or renal arteries had to be reimplemented.

†Crawford classification.

- In situ reconstruction in infrarenal aorta and iliac artery: only in low-grade infection

Result

- Factors influence outcome: anatomic location, surgical treatment, status of rupture, bacteriology



- Follow up 47 months:
 - 10 died (only one related to mycotic aneurysm)
- Follow up 11 survivors
 - One: mycotic aneurysm

Discussion

- ⦿ The mortality was higher in the extra-anatomic reconstruction:
 - If infrarenal, in situ reconstruction use in cases of low-grade infection
- ⦿ Intensive antibiotic therapy should be started perioperatively, a broad spectrum antibiotic should be used until culture sensitivity report

Surgical treatment for primary infected aneurysm of the descending thoracic aorta, abdominal aorta, and iliac arteries

Ron-Bin Hsu, MD, Yeou-Guang Tsay, MD, PhD, Shoei-Shen Wang, MD, and Shu-Hsun Chu, MD,
Taipei, Taiwan

JOURNAL OF VASCULAR SURGERY
October 2002

RETROSPECTIVE REVIEW

Patients and methods

- From 1996/10 to 2001/10,
- Primary infected abdominal aortic aneurysm
- N=24
 - Surgery: 19 (descending thoracic aorta, abdominal aorta, iliac arteries)
 - Non-surgery: 5
- Patients:
 - Men: 13, women: 6
 - Mean age: 66.1 ± 9.9 years (range 51~85 years)
- Medical co-morbidities:
 - HTN (9), DM (3), old stroke (3) idiopathic thrombocytopenic purpura (2), pure red cell anemia, liver cirrhosis hepatocellular carcinoma, uremia under hemodialysis, bronchial asthma, and chronic alcoholism

Patient and method

- ⦿ Surgery not performed

- Man, 81 y/o, infected infrarenal abdominal aortic aneurysm: 6 wks antibiotic, CT 6 months later: 3 cm aneurysm without rupture
- 4: aortic pseudoaneurysm (3~5 cm), refused operation due to old age (all > 80 yo) and multiple medical comorbidities, all died of shock within 1 month after admission

Preoperative assessment

⦿ Diagnosis

- Clinical evidence of infection: fever, leukocytosis
- Image:
 - Soft tissue infiltration, CT or MRI
 - Aortic dilation with diameter > 3 cm
- 19 surgical patients

⦿ Antibiotics:

- Given once the infected aorta was confirmed
- If salmonella: Cetriaxone, 1000-2000 gm Q12H

⦿ Surgical intervention

- After 4~6 weeks antibiotic, no sign of infection (fever, leukocytosis)
- Early surgical intervention: o, uncontrolled infection, evidence of aortic rupture

⦿ Surgery:

- wide debridement of necrotic tissue, copious saline irrigation, in situ repair with Dacron graft through a thoracotomy, a thoracoabdominal incision, or a midline laparotomy.

⦿ Postoperative management

- Post OP: 6 wks until normal Lab parameter (BT, CRP, WBC)
- Antibiotics: continued PO at least 6 months

Result

◎ Pst with OP n=19

• Type:

- 4 : initial imaging study infected aorta, repeated imaging study: pseudoaneurysm.
- 2: infected aneurysm
- 13: infected pseudoaneurysm

• Position:

- 9: suprarenal (4 proximal descending aorta, 2 distal descending aorta, 3 suprarenal abdominal aorta)
- 10: infrarenal (8 infrarenal abdominal aorta, 2 iliac artery aneurysm)

Table I. Patient data

<i>Case no.</i>	<i>Age (y)</i>	<i>Sex</i>	<i>Fever</i>	<i>Pain</i>	<i>Shock</i>	<i>Pseudoaneurysm at operation</i>	<i>Operation</i>	<i>Hospital outcome</i>	<i>Late death</i>	<i>Pathogen</i>
1	78	M	+	-	+	+	+	Dead	+	Bacteroides
2	51	M	+	+	-	+	+	Alive	-	Salmonella
3	74	M	+	-	-	+	+	Alive	-	Salmonella
4	58	M	+	+	+	+	+	Alive	-	Salmonella
5	62	M	+	+		+	+	Alive	-	Salmonella
6	61	F	+	+		-	+	Alive	-	Salmonella
7	54	M	+	+		+	+	Alive	-	Staphyloco
8	72	M	+	+	+	+	+	Alive	-	Salmonella
9	76	F	+	+		+	+	Alive	-	Salmonella
10	71	M	+	+		+	+	Alive	-	Salmonella
11	61	F	-	-		+	+	Alive	+	Streptococ
12	69	F	+	-		+	+	Alive	-	Salmonella
13	57	M	+	+		+	+	Alive	+	Salmonella
14	84	F	-	+		+	+	Alive	-	Tuberculos
15	61	M	+	+		+	+	Alive	-	Salmonella
16	61	M	+	+		+	+	Alive	-	Salmonella
17	59	M	+	+		+	+	Alive	-	Salmonella
18	62	M	+	+		-	+	Alive	-	Salmonella
19	85	F	-	+	+	+	+	Alive	-	Streptococ
20	82	F	+	+	+	+	-	Dead		<i>E. coli</i>
21	80	M	+	+	+	+	-	Dead		Salmonella
22	83	M	+	+	+	+	-	Dead		Salmonella
23	86	M	+	+	+	+	-	Dead		Salmonella
24	81	M	+	+	-	-	-	Alive		<i>E. coli</i>

Result

- Clinical manifestation:
 - febrile (89%), leukocytosis (89%), localized pain (79%)
- Mean duration of preoperative antibiotic use: 14.5 +/- 11.2 years
- Microorganism:
 - 14 (74%), salmonella species.
 - 2 (11%), streptococcus
 - 1, *Staphylococcus aureus*, *Bacteroides*, species and *Mycobacterium tuberculosis*
- No perform extra-anatomic reconstruction with axillofemoral bypass

Hospital outcome

- ◎ In hospital mortalities 5% and morbidity
 - 0% in infrarenal infections
 - 11% (1/9) in suprarenal infection (septic shock and aneurysm rupture)
 - Acute renal failure : 2 with suprarenal infection
- ◎ Late deaths
 - 1 Early graft infection (5%), in-hospital death at 4 months
 - 1 UGI bleeding at 4 months after OP
 - 1 asthma and respiratory failure at 3 months after OP
- ◎ 16 patients:
 - alive and no late aortic graft infection after a mean follow up 23.6 months (range 4-63 months)

Discussion

- ⦿ Factors determine surgical outcome
 - Anatomic location of the infection
 - Severity of the infection (rupture or not)
- ⦿ in hospital Mortality rate:
 - Operated patient: 1/19 (5%)
 - unoperated patient: 4/5 (80%)
 - Aortic rupture: 4/4 (100%)
 - report of other hospital: 16%~44%

Extra-anatomic reconstruction and in situ repair

- ⊙ Extra-anatomic bypass graft
 - Indicate to mycotic aneurysm in infrarenal abdominal aorta
 - Disadvantage: early graft thrombosis, prosthetic graft infection
- ⊙ In situ repair:
 - Indicate to mycotic aneurysm in suprarenal abdominal
 - Contraindication to infrarenal mycotic aneurysm, especially *S. aureus*, grossly purulent infection, salmonella infection,
- ⊙ In this report:
 - All pts: in situ report
 - 7/16 (living pts) no routinely follow up by CT or MRI, 6~12 after OP: no evidence of recurrent infection

- ⦿ Infected aortic aneurysm is common in TW
- ⦿ Most common microorganism:
 - *S aureus* and *Streptococcus* species, *Salmonella* organisms
 - *Salmonella* infection: high re-infection and mortality rate
- ⦿ In this study:
 - salmonella infection 74 %
 - low mortality and no re-infection
 - Early diagnosis
 - High response rate to third-generation Cephalosporines, early surgical intervention

In conclusion

- In situ reconstruction is one of the choice for mycotic aneurysm of infra-renal aorta and iliac artery
- The evidence is not much enough

Thanks for your attention

Comment

- ◎ Dr. 簡迺娟: paper中沒有比較組,無法針對問題作回答.
- ◎ Dr. 李宜恭: 病人的是E. coli infection或是 Salmonella infection 未曾處理好?
 - Ans: 推測是salmonella induced mycotic aneurysm 經過 in situ reconstruction後, graft的存在造成 E. Coli的 infection,
- ◎ Dr.李宜恭: 由paper看來抗生素的使用對預後非常重要,但用法眾說紛紜,可作為討論主題
- ◎ Dr. 陳偉華: 此題目所找到的論文雖然大多案數不多,但可以做統合比較