Renal infarction

A brief review,
and some experiences in Taiwan

2009/01/23
Presented by
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Outline

- Part I　Our case report
- Part II　A brief review
- Part III　Experiences in Taiwan
- Part IV　Apply to our patient

Part I　Case report

A 53-year-old female
with poor oral intake and decreased urine output
for 4 days

Basic data

- Bed number 2836-2
- Chart number 8540727
- Name: 許Ｏ梅
- Gender: female
- Age: 53 years old

Chief complaint

- Poor oral intake and decreased urine amount for 4 days

Present illness

In recent 4 days:

- Poor oral intake with nausea/vomiting
- Decrease urine amount without dysuria
- Less water intake (<500 c.c.)
- Chills without fever
- Mild cough
- Abdominal pain without diarrhea or constipation

Past history

- 2007. Dec
  - CVA with R`t hemiplegia
  - rehabilitated in 中港院區
- 10+ years ago
  - valve replacement for heart disease
- Hypertension for years
- No DM history

Drug history

- Coumadin 1# QOD
- Norvasc 1# BID
- Doxaben 1# HS
- Sennapur 2# HS
- Keppra 1# BID (with seizure hx)

Physical exam

- Clear consciousness
- Vital signs: 36/72/20, BP146/89
- Heart sounds: diastolic murmur
- Knocking pain (+)
- Pitting edema

Lab workup

2009/01/15, ER

- CBC/DC
- Urine analysis
- BUN, Cr, glucose, Na, K,
- r-GT, Alk-P, ALT, Lipase, Bilirubin
- CRP
- PT, APTT

2009/01/15 ER

- CBC/DC

項目名稱	報告值
W.B.C (4000-11000)	14730
R.B.C (400-500)	571
Hb. (12-16)	16.6
Ht. (36-46)	48.3
MCV (84-100)	84.6
MCH (28-32)	29.1
MCHC (32-36)	34.4
Platelet (150000-400000)	237000
Seg (40-75)	83.9
Lymho (20-45)	8.8
Mono (2-10)	7.1
Eos (1-6)	0.1
Bas (0-1)	0.1

- PT, APTT

Pro-Time (8.0-12.0)	10.7
Pro-time INR	1.08
A.P.T.T. (25.4-36.0)	24.2

2009/01/15 ER

- U/A

項目名稱	報告值	項目名稱	報告值
Color	yellow	Protein	+
Appearance	clear	Urobilinogen (0.1-1.0)	0.1
Glucose	-	Nitrite	-
Bilirubin (-)	-	Leukocyte esterase	-
Ketones	-	RBC	2-3
Sp.Gr.	1.023	WBC	2-5
Occult Blood	-	Ep.cell	2-5
pH	6.5	Bacteria	+/HPF

2009/01/15 ER

- Blood chemistry

項目名稱	報告值	單位	報告時間
BUN (6-22)	15	mg/dl	2009/01/15 12:05
NA (138-146)	137	mmol/l L	2009/01/15 12:05
K (3.0-5.0)	3.5	mmol/l	2009/01/15 12:05
Glucose(AC) (60-110)	103	mg/dl	2009/01/15 12:05
CRE (0.5-1.3)	0.8	mg/dl	2009/01/15 12:05
r-GT (7-49)	24	IU/l	2009/01/15 15:30
ALT(GPT) (3-37)	27	IU/l	2009/01/15 12:05
ALP (43-122)	114	IU/l	2009/01/15 12:05
DB (0-0.2)	0.02	mg/dl	2009/01/15 15:30
Indirect Bilirubin (0.2-0.7	2.04	mg/dl H	2009/01/15 15:30
TB (0.2-1.2)	2.06	mg/dl H	2009/01/15 12:05
LIPASE (7-60)	23	U/L	2009/01/15 12:05
C.R.P (< 0.4)	0.699	mg/dl H	2009/01/15 12:18

Image study ER

- KUB
  - Radiopacified spots at pelvis is noted
- Abdominal CT
  1. left kidney
     Wedge-shaped less-enhanced area
  2. No space-occupied lesion in liver, GB, pancreas, spleen

★ Impression

Lt. kidney,

suspect pyelonephritis or infarction

D. Diagnosis

Pyelonephritis or renal infarction ?

Part II A brief review

UpToDate.

Diagnosis and treatment of renal infarction

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Section Editor Paul M Palevsky, MD
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Last literature review for version 16.3: 十月 1, 2008 | **This topic last updated:** 九月 22, 2008

Renal infarction

Introduction

- Rare
- Diagnosis is frequently missed or delayed

Etiology

- Thromboemboli (Af most, MI, IE, tumor, fat)
- in-situ thrombosis (less, RAS, trauma, iatrogenic, APS)
- underlying cause is hard to find (cocaine)

Renal infarction

Symptom/Sign

- flank pain
- generalized abdominal pain
- nausea and vomiting
- Fever
- Oliguria is less common
- acute BP ↑ (renin-related)

Renal infarction

Lab findings

- WBC↑
- Cr ↑ (esp. in large, or bilateral infarct)
- Hematuria (less common, ∵ GFR↓)
- Proteinuria
- LDH↑ (With normal AST/ALT and urine LDH↑)

Renal infarction

Diagnosis (often delayed)

- Recommended tests
  1. CBC/DC
  2. Cr, BUN, LDH
  3. U/A, U/C
  4. EKG (Af?)
- CT
  - preferred initial test for flank pain
  - gold standard for the diagnosis of stones
  - ★ contrasted CT to enhance the infarction

Renal infarction

D. Diganosis

- Renal colic
  - flank pain and hematuria
- APN
  - flank pain and fever
  - pyurian

★ LDH not elevated

Renal infarction

Treatment

- For HTN
  - ACEI or ARB
- For the kidney
  - anticoagulation, endovascular therapy, open surgery
  - lack of comparative studies
  - The optimal treatment is uncertain

Renal infarction

Treatment

- Anticoagulation (mostly used)
  - favorable prognosis (better than untreated?)
  - iv Heparin + oral Warfarin
  - goal→ **INR 2.5-3.5**

★Clear indications:

Af, prosthetic heart valves, hypercoagulable state

Renal infarction

Treatment

- Thrombolysis and thrombectomy
  - risks v.s. benefits
  - any contra-indications ?

★ **time is KIDNEY** (how late is too late?)

- Surgery
  - mostly for traumatic occlusion

Renal infarction

- Prognosis

A 2004 review

- 11.4% mortality rate in the 1st month
- Cr. was stable mostly

A retrospective series (44 patients A.f)

- 61% normal kidney function
- 8% dialysis dependent

Part III

Experiences in Taiwan

doi: 10.1111/j.1742-1241.2006.01136.x

ORIGINAL PAPER

International Journal of Clinical Practice

Acute renal infarction: a 10-year experience

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International Journal of clinical practice

Summary

- 1995-2004

★18 Taiwan patient with ARI

- 14 non-taumatic; 4 traumatic
- Diagnosis delay: 1.9 days
- 39% with concurrent events
- 64.5 % had Af, heart dz, or embolic event

Summary

- Lab data
  - neither specific, nor sensitive
  - Cr: normal or slightly elevated
- Treatment 16
  - Conservative 9
  - local thrombolytic 5
  - i.v. thrombolytic 2

Summary

- ARI may resemble many non-renal diseases
- Requie repeated evaluation and a highly suspicion
- Notice concurrent injuries or thromboembolism in other foci
- Consider early contrast-enhanced CT
- Follow up by functional studies (如：核醫檢查) instead of Creatinine

Table 1 Characteristics, laboratory findings and treatment (*n* = 18)

Number	Age (years)	Sex	Side	Duration§	Symptoms	Risk factors	U/A	WBC	LDH	AST	CK	CRP	Treatment
1	75	F	L	2	Abdo pain; F	HTN, IHD	N	11,900	5184	225	81	4.66	C
2	50	F	R	3	Abdo pain; N; F	VHD, AF, CVA,	N	8100	N/A	18	N/A	7.88	IAT
3	50	F	L	1	Flank, abdo pain; N	VHD, AF, CVA, ARI	N	9200	319	27	23	N/A	IAT; AP
4	65	F	B	1	Abdo pain; N	APLS, HTN	P	5100	N/A	65	16	8.82	IVT
5	41	M	L	5	Flank, abdo pain	NPC	N	5470	N/A	36	N/A	N/A	C
6	36	M	L	2	Flank pain; F	DCM, HTN, IHD, DM	P	5500	N/A	43	86	N/A	C
7	45	M	R	2	Flank, abdo pain; F; V	HTN	P	15,800	N/A	24	N	N/A	C
8	79	F	R	1	Flank, abdo pain; F	VHD, AF, HTN, IHD,	P	17,400	N/A	127	123	37.58	IAT
9	47	M	R	2	Flank pain; F	AF	N	16,700	1095	52	45	10.95	IAT
10	40	M	L	1	Flank pain	Nil	N	10,200	N/A	60	298	0.38	IAT
11	56	F	L	2	F	AF, HTN,IHD, DM, emphysematous PN	P	21,000	N/A	32	N/A	N/A	OP*
12	34	F	R	2	Flank pain; F	VHD	P	15,300	N/A	30	N/A	N/A	IVT
13	57	F	L	2	Flank pain; F; hypotension	CVA, DM, renal abscess	P	16,800	N/A	56	N/A	N/A	OP†
14	52	M	B	5	N	Heroin abuse	N	20,320	N/A	54	N/A	N/A	C
15	20	M	L	1	Flank pain	Trauma (TA)	P	12,000	N/A	21	N/A	N/A	C
16	22	M	R	1	Flank pain	Trauma (TA)	P	10,700	N/A	21	N/A	N/A	C
17	20	M	R	1	Flank and abdo pain	Trauma (falling down)	N	13,800	N/A	33	275	N/A	C‡
18	16	M	R	1	Flank pain	Trauma (TA)	N	17,200	N/A	148	N/A	N/A	C

Table 2 Clinical characteristics of patients with acute renal infarction (n = 18)

Characteristics	Number of patients (%)
Female:male	
All	6 : 12
Non-trauma	6 : 8
Age (year; mean ± SD)	
All	44.7
Non-trauma	51.9
Side (left:right:bilateral)	
All	8 : 8 : 2
Non-trauma	7 : 5 : 2
Time to diagnosis (day)	
All	1.9
Non-trauma	2.2
Trauma	4
Non-trauma	14

Presenting symptoms in non-trauma patients	
Flank pain	13
Fever	9*
Abdominal pain	8
Nausea/vomiting	4
Concurrent events	7/18 (39%)
Trauma	
Mesentery tear with internal bleeding	1
Liver laceration	1
Non-trauma	
Spleen infarction	2
Non-Q myocardial infarction	1
Cerebral infarction	1
Arthrosclerosis obliterans	1

*Two cases of infection (emphysematous pyelonephritis and renal abscess).

Risk factors

Table 3 Risk factors and presumed aetiologies of acute renal infarction (n = 18)

Atrial fibrillation	5
Valvular heart disease	4
Ischaemic heart disease	4
Previous embolic disease	4
Dilated cardiomyopathy	1
Congestive heart failure	2
Malignancy	1
Antiphospholipid antibody syndrome	1
Dissection of renal artery	1
Heroin abuse	1
Diabetes mellitus	3
Hypertension	7
Trauma	4

CT

Table 4 Reasons prompting contrast-enhanced CT study and initial clinical impression (n = 18)

Reasons	Number of patients (%)
Confirming presence of ARI	3 (16.6)
Evaluating aetiologies from renal origin (total)	9 (50)
Persistent unexplained flank pain* urolithiasis	6 (33.3)
Renal contusion	2 (11.1)
Emphysematous PN	1 (5.6)
Evaluating non-renal aetiologies (total)	6 (33.3)
Acute abdomen (hollow organ perforation)	1 (5.6)
Acute cholecystitis	1 (5.6)
Diverticulitis	1 (5.6)
Ischaemic bowel disease	1 (5.6)
Liver laceration	1 (5.6)
Internal bleeding	1 (5.6)

*Urolithiasis; delayed contrast excretion in i.v. pyelography study.
CT, computerized tomography; PN, pyelonephritis.

Treatment and outcome

Table 5 Treatments and outcomes for patients with acute renal infarction (n = 18)

Treatment and outcomes	Number of patients (%)
Conservative	9 (50)
Intravenous thrombolysis	2 (11.1)
Local thrombolysis	5 (27.8)
Surgery	2 (11.1)
Outcome	
Follow-up angiography	4 (22.2)
Radiological improvement	2 (11.1)
No interval change	2 (11.1)
No follow-up angiography	1 (5.6)
Normal renal function (<1.5 mg/dl) or serum Cr elevation <25% of baseline	16 (88.9)
End-stage renal disease	1 (5.6)
Death	1 (5.6)

Part IV
Apply to our patient

Apply to our patient

- S: abdominal pain, nausea/vomiting
- O: Knocking pain (+)
  - WBC ↑, Cr 0.8,
  - EKG: normal sinus rhythm
  - Diastolic murmur
  - Valve replacement history
    - with Coumadin use
  - INR: 1.08
  - CT: L`t, wedge-shape low density

Apply to our patient

- A: Renal infarction
  with inadequate INR control
- Plan

1. Adjust Coumadin to theraputeic level
   (goal: INR 2-3)
2. Arrange cardiac echo to see if any cardiogenic emboli
3. Survey other risks of atherosclerosis

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Thanks for the attention!

2009-01-23, in CSMUH