Renal failure after orthopaedic treatment

Slobodan Peric
Hietzing Community Hospital
3rd Medical Department
Vienna, Austria

Medical History

- male, 75y0
- referred from other hospital due to rapidly worsening renal function

- Hx:
  - pulmonary embolism (1984)
  - colon cancer w/ right hemicolectomy (2002)
  - incidentaloma left adrenal gland (2.5cm in diameter)
  - arthroscopy right knee (2005)
  - no known renal pathologies, no arterial hypertension

Recent course of events

- had infiltration of left knee by orthopedist (due to meniscal problems)
- developed joint empyema (approx. 4 weeks prior to admission to our ward) → admission to orthopaedic ward
- arthroscopy w/ partial synovectomy + antibiotics (Cefazoline) for 8 days (puncture fluid culture: S. aureus – sensitive to most antibiotics)
- subsequently developed:
  - arterial hypertension, treatment-resistent to 5 BP lowering meds
  - weight gain of 11kgs, associated dyspnea
  - normochrome anemia

Clinical exam

- 1.72m, 101kg; BP 184/75mmHg
- regular + rhythmic heartbeat, no heart murmur, 77bpm
- dyspnea upon moderate exertion
- mild hepatomegaly
- peripheral oedema
- urine output mildly reduced, no oliguria
- remaining exam w/o significant findings

Lab results at time of presentation

	measured value	Ref range
Leukocytes	3.57G/l	4.4-11.3
Thrombocytes	267G/l	150-400
Erythrocytes	3.1T/l	4.5-5.9
Hemoglobin	8.8g/dl (2 units of blood given 2 days ago)	14.0-17.5
MCV	85.0fl	80.0-96.0
MCH	28.1pg	28.0-33.0
C-reactive protein	18.5mg/l	<5
Creatinine	8.04mg/dl (1 day earlier: 6.90mg/dl)	<1.25
BUN	55mg/dl	8-20
Lactate dehydrogenase	281U/l	125-243
BNP	399ng/l	<100

Urine testing

Urine		Ref range
Leukocytes	13/mcl	<25
Erythrocytes	623/mcl	0
Total protein	291.0mg/l	<120
TP/creatinine ratio	0.93mg/g creatinine	<0.15
Albumine	143.8mg/l	<6
Albumine/creatinine ratio	459.2mg/g creatinine	<30

Additionally:
- no acanthocytes
- c-ANCA (PR3) and p-ANCA (MPO) negative
- Anti-Phospholipase A2 receptor antibody negative
- sonography: no postrenal failure; left kidney unremarkable (12cm), right kidney appears swollen (14.7cm)

How do we summarize these findings?

+ acute worsening of renal function
+ new onset arterial hypertension
+ haematuria
+ proteinuria

→ this patient has **nephritic syndrome**

What should be the next step?

A) repeat lab testing to confirm findings?

B) additional lab tests?

C) CT scan?

D) kidney biopsy?

E) administer steroids?

F) initiate hemodialysis?

Histological exam

- segmental focal necrotizing GN w/ florid partial cellular crescents
  - → RPGN (rapidly progressive glomerulonephritis)
    - → This is a nephrologic emergency
    - → impending irreversible loss of kidney function or worse

- pauci immune (i.e. no deposits of Igs and immune complexes)
  - → RPGN Type III

What‘s the most likely diagnosis?

- A) Goodpasture syndrome
- B) renal systemic lupus erythematosus
- C) granulomatosis with polyangiitis (former Wegener‘s disease)
- D) microscopic polyangiitis
- E) membranous glomerulonephritis

Histological diagnosis

- Pauci immune crescentic GN is a finding consistent with ANCA-associated vasculitides (i.e. GPA, MPA, eGPA)
- out of these three microscopic polyangiitis (MPA) is the most likely diagnosis
  - confirmed renal involvement
  - MPO-ANCA (and PR3-ANCA) negative
  - no granulomas → GPA possible but unlikely
  - likely triggered by dissemination of S. aureus after knee joint infiltration
- CT & MRI: lungs and CNS not affected
- clinically no involvement of any other organ system

How should we treat this condition?

- high dose steroids?
- plasma exchange?
- Cyclophosphamide?
- Rituximab?
- Azathioprine?
- Methotrexate?

Initial treatment

- Methylprednisolone
  - 1g QD for three days
  - afterwards downtitrated to 1mg/kg + slow tapering
- plasma exchange
  - (day 1,2,3,5,7,9,11)
- CVVHD

Initial and Maintenance Therapy

- How do we choose an appropriate agent for (chronic) immunosupression?
  - Screen for dormant infections (Hep B, Hep C, TBC,…)
    - This patient had a positive IGRA (Quantiferon assay) → latent Tuberculosis
    - 6 mo treatment w/ Isoniazid started
    - ongoing treatment of knee infection w/ Daptomycin
  - KDIGO GN guideline recommends corticosteroids along with either cyclophosphamide or rituximab as first line for initial treatment
  - Rituximab chosen b/c of higher risk of infections w/ Cyclophosphamid

KDIGO Clinical Practice Guideline for Glomerulonephritis, 2012

Follow up

- Patient remains to this day on renal replacement therapy
- Urine production improving → RRT soon to be discontinued
- further Rituximab administrations planned (as maintenance therapy)
  - d0, d14, d180, d360, d540
- long term prognosis
  - underlying disease is in remission
  - long term prognosis generally limited by immunosupressive therapy and associated complications

Key points

- even interventions that seem relatively safe can have catastrophic consequences for the patient
- in most cases these are unforseeable and not necessarily associated with errors
- in this case one could speculate that the described course of events could have been avoided

That‘s it!
Thank you for your attention!