

A PAIN IN THE ...



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MR XY

- 72 yo transferred from Echuca Hospital with:
 - Hypotension
 - Abdominal wall cellulitis for surgical debridement
 - ? Necrotising fasciitis



PMHX

- AF-on warfarin and sotalol
- COAD/Asthma -on Spiriva, ventolin prn
- ? Pulmonary fibrosis;
 - restrictive pattern on PFTs 2 y ago (no lung Bx, no treatment)
- Haematuria ~ 15 months ago-investigated with cystoscopy X 1-nil cause found
- Epididymo-orchitis;
 - hydrocele 'needled' by urologist 12 months ago
 - on Norfloxacin for 8 months (!)



SHX

- Retired farmer (cattle mainly, but also grains)
- Travelling each winter to North Queensland with wife for 3-4 months in a caravan
- Ex smoker-ceased more than 20 y ago
- 1-2 SD/week







COMING HOME WAS A PAIN IN THE...

- Pain in the Left buttock developing whilst travelling through Mildura
 - no associated symptoms
 - saw LMO-started Flucloxacillin
 - pain settled after 3 days
- Continuing travel towards Echuca





Echuca

ON ARRIVAL HOME

- Saw LMO 3 days later
 - R abdominal wall pain and swelling
 - fever and rigors for 24 h
- 'Abscess' of abdominal wall > referred to the ED
- In ED
 - Hypotensive (SBP 75)
 - Febrile 38.6°C



IN ECHUCA ED

- Hb 162, WCC 16.8, Ne 14.4, Ly1.4, Eo 0.1
- INR 3.6
- Na 133, K 4.5, Urea 7.5. Creat 75
- CRP 220
- IV Flucloxacillin, Benzylpenicillin, Gentamicin, Metronidazole, 3L NS given

- Seen by the surgical team-referred for surgical debridement and ICU support
 - Referred WHF



IN WHF- DAY 1

- Surgical debridment of R abdominal wall abscess;
 - green macerated necrotic fat,
 - necrotic tissue tracking down to fascial plans,
 - viable muscle-> Vac dressing applied,
 - tissues sent for *culture only*
- IV Meropenem, Vancomycin, Lincomycin
- ID referral for 'necrotising fasciitis'



IN WHF- DAY 2

- Wound exploration and Vac dressing change
 - viable tissue,
 - no ongoing necrosis
 - tissue send for histopathology and culture
- Clinically improving
- Area of erythema over the abdominal wall reducing in size
- L buttock small area of induration
- Not requiring catecholamine support
- Extubated post surgery



IN WHF- DAY 3

- Phone call from the microbiology lab:
“3/4 tissue samples growing a filamentous white fungus”
- What could this be?



WHAT DID WE DO

- Commenced on Voriconazole
- Next morning; fungus looking like :



CULTURE



DIAGNOSIS

- Probable mucor - ? Rhizopus



CLINICALLY

- Continuing to improve
- R abdominal wall -vac dressing in situ, erythema and induration reducing
- Further tissues from margin of abdominal wound negative on histopathology and cultures



NEXT STEP?



- Is it localised or disseminated?



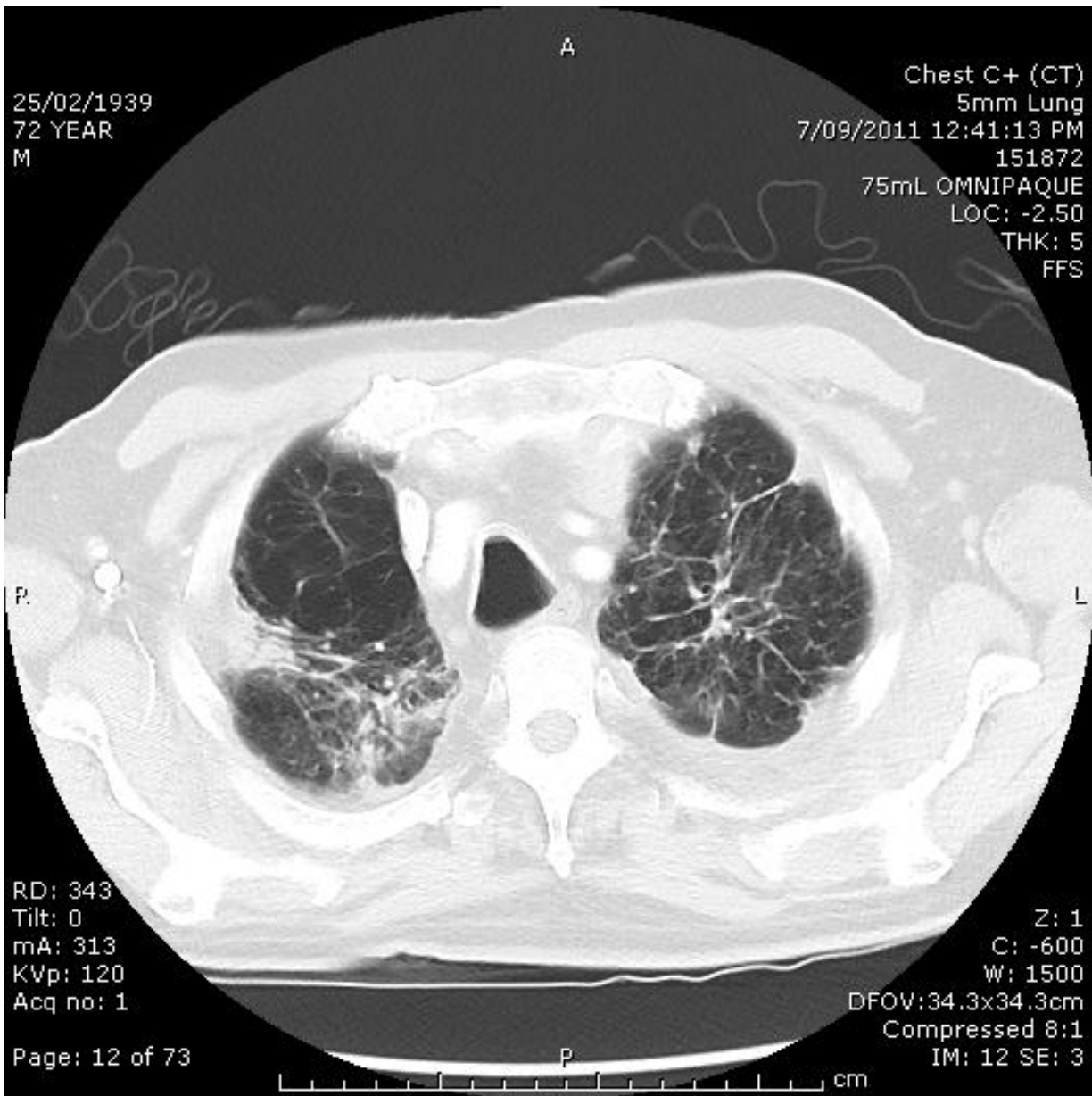
CT HCAP

- RLL small cavity with fluid possibly communicating with small pleural effusion
- R prostate lobe abscess
- Epididymo-orchitis



25/02/1939
72 YEAR
M

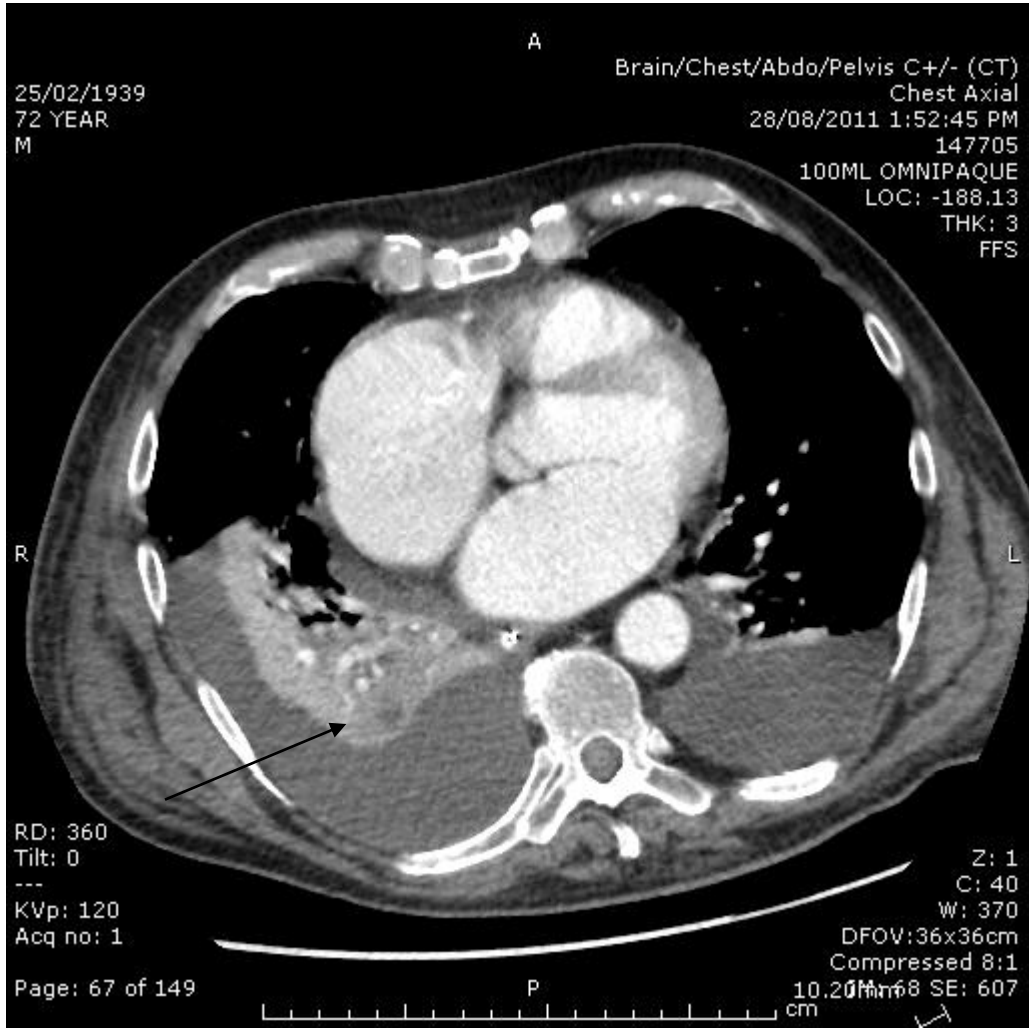
Chest C+ (CT)
5mm Lung
7/09/2011 12:41:13 PM
151872
75mL OMNIPAQUE
LOC: -2.50
THK: 5
FFS



RD: 343
Tilt: 0
mA: 313
KVp: 120
Acq no: 1

Z: 1
C: -600
W: 1500
DFOV: 34.3x34.3cm
Compressed 8:1
IM: 12 SE: 3





25/02/1939
72 YEAR
M

A

Brain/Chest/Abdo/Pelvis C+/- (CT)
Abdo Axial
28/08/2011 1:54:07 PM
147705
100ML OMNIPAQUE
LOC: -606.44
THK: 3
FFS



RD: 360
Tilt: 0

KVp: 120
Acq no: 2

Z: 1
C: 90
W: 498
DFOV: 36x36cm
Compressed 8:1
IM: 141 SE: 611

P



OTHER TESTS

- Iron studies – Ferritin 3468/Fe 13/Trans sat 48
- Ig levels-WNL
- Hb A1c 6.1
- Haemochromatosis gene mutation Analysis (C282Y and H 63D mutations)-neg
- Ne function test-normal
- HIV serology neg



NEXT STEP?



OUR APPROACH

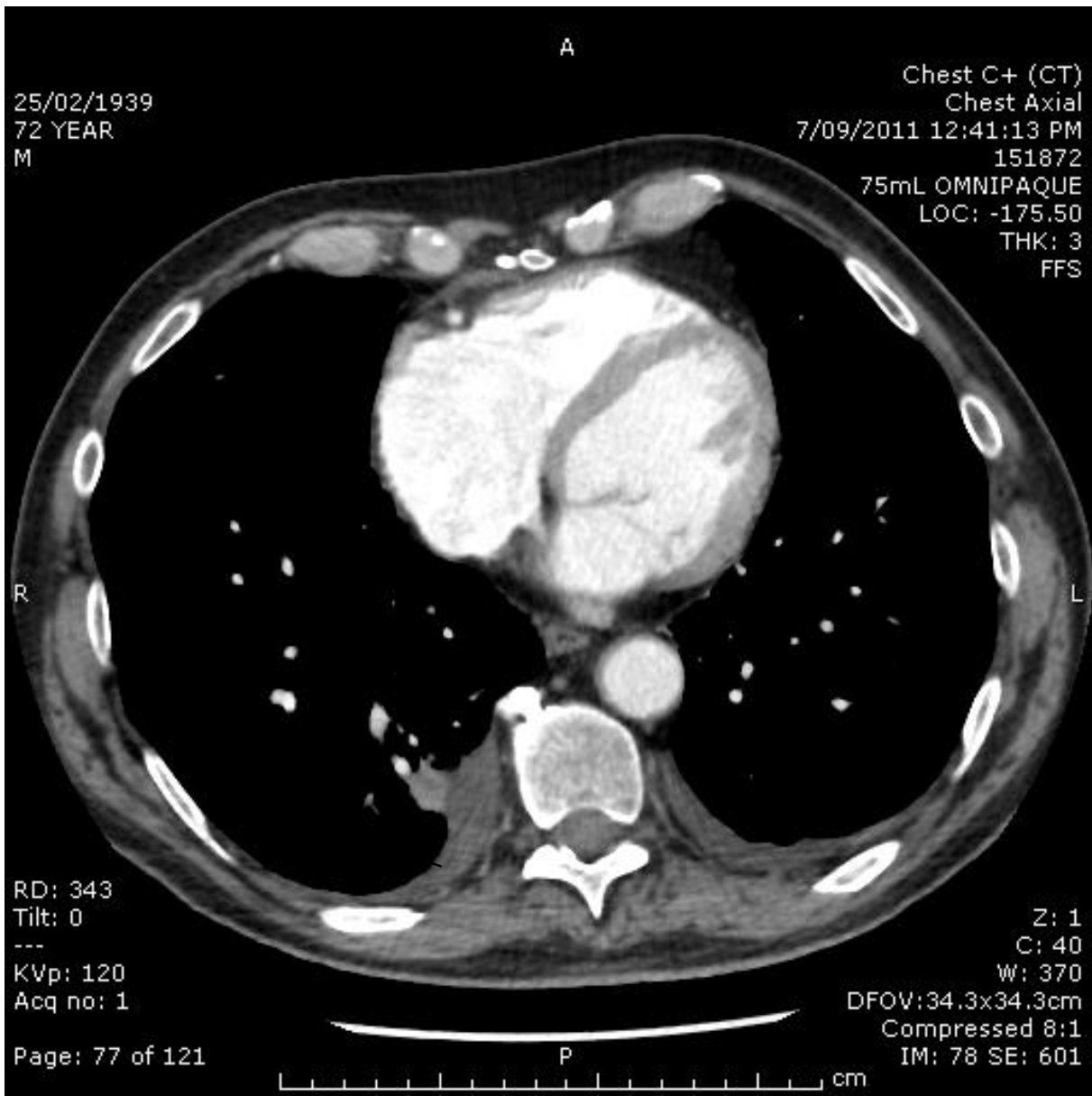
- IV ambisome 5mg/kg
- Further debridment of abdominal wall with specimens for histopathology and culture
- Buttock lesion exploration with tissue for histology and culture
- R prostate lobe resection and tissues send off for microscopy and histopathology
- Pleural effusion drainage



RESULTS

- Buttock tissues;
 - growing a zygomycete,
 - histopathology-no fungal elements seen
- Prostate tissue;
 - no growth, chronic inflammatory changes on histology
- Pleural fluid;
 - transudate, no growth
- Repeat CT chest post effusion drainage:





DIAGNOSIS

- Disseminated cutaneous mucormycosis/zygomycosis in an immunocompetent patient without history of local trauma
- Spp. *Saksenaea vasiformis*
- Managed initially with
 - wide surgical debridement (clear surgical margins)
 - systemic antifungals
 - Ambisome (Liposomal Amphotericin B),
 - changed to posaconazole on day 7



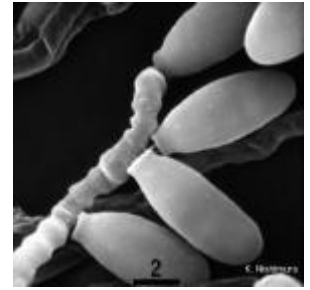
MUCORMYCOSIS



- Common fungi found in soil and decaying vegetation
- Broad hyphae, irregularly branched, rare septa
- Release a large number of spores (can become airborne)
- Frequent lab contaminants



MUCORMYCOSIS



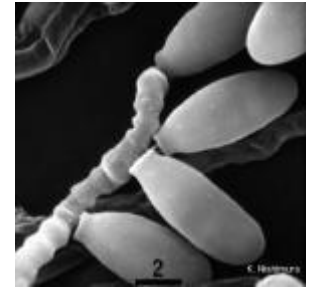
- Family Zygomycetes mucorales

- Common infections in humans
 - Rhizopus
 - Mucor
 - Rhizomucor

- Uncommon infections in humans
 - Cunninghamella
 - Absidia
 - Saksenaea
 - Apophysomyces



MUCORMYCOSIS



- Spores are usually inhaled
- Angio-invasive infections (infarction of the infected tissue-the hallmark of this infection)
- 25-85% mortality
- 90% mortality if necrotising fasciitis develops*

*J. Chander, J. Kaur, A. Attri , H. Mohan. Primary cutaneous zygomycosis from a tertiary care centre in north-west India . Indian J Med Res 131, June 2010, pp 765-770.



MUCORMYCOSIS



- Usually occurs in immunocompromised hosts
 - Diabetes
 - Organ transplant
 - Haematological malignancies
 - AIDS
 - Treatment with desferoxamine and iron overload
 - Treatment with glucocorticoids
 - Trauma and burns
 - Malnutrition
 - IDU



FEW PATHOGENETIC FACTS



- Rhizopus organisms contain a ketone reductase
 - inhibited in the serum of healthy individuals
 - thriving in high glucose acidic conditions (e.g. DKA)
- Desferoxamine-iron chelate (feroxamine) is a siderophore for Rhizopus spp
 - Increases iron uptake by the fungus
 - Stimulates fungal growth and pathogenicity (e.g. angioinvasiveness)
- Iron overload (haemochromatosis, diabetes)*
- Statins have in-vitro inhibitory activity
- *Maertens J, Demuyneck H, Verbeken EK, Zachée P, Verhoef GE, Vandenberghe P, Boogaerts MA. Mucormycosis in allogeneic bone marrow transplant recipients: report of five cases and review of the role of iron overload in the pathogenesis. Bone Marrow Transplant. 1999;24(3):307.



MUCORMYCOSIS

○ Syndromes

- Rhinocerebral
- Pulmonary
- Gastro-intestinal
- Cutaneous
- Renal



CUTANEOUS MUCORMYCOSIS



- **Cutaneous mucormycosis: Two documented cases of suspected nosocomial cause**
- Douglas L Sheldon, Wayne C Johnson
- JAMA 241: 1032-1034, 1979



CUTANEOUS MUCORMYCOSIS



- **Multifocal cutaneous mucormycosis complicating polymicrobial wound infections in a tsunami survivor from Sri Lanka.**
[Andresen D](#), [Donaldson A](#), [Choo L](#), [Knox A](#), [Klaassen M](#), [Ursic C](#), [Vonthehoff L](#), [Krilis S](#), [Konecny P](#).
- Department of Microbiology, South Eastern Area Laboratory Services, St George Hospital, Sydney, New South Wales, Australia.

Lancet. 2005 Jul 2-8;366(9479):28.



CUTANEOUS MUCORMYCOSIS



- Almost always associated with local trauma or wounds
- IV catheters, insuline or IM injections, surgical scar, spider bites, dressings, splints, burns
- Clinical presentation
 - Area of skin induration and cellulitis
 - Localised pain
 - Necrotic area (variable)
 - Rapidly progressing tissue necrosis
 - usually with open wounds contaminated with spores



DIAGNOSIS

- Histopathology (calcofluor white and methenamine silver stains)
- Culture
- Direct PCR-based restriction fragment length polymorphism on histological specimens



MANAGEMENT

- Wide surgical debridement
- Early initiation of Amphotericin B (5-10mg/kg)
- Posaconazole



MANAGEMENT

○ **Echinocandins:**

- no in-vitro activity against mucormycosis
- Rhizopus expresses the target enzyme for echinocandins ? Clinical utility



The unusual features of this case and questions posed

- Multifocal cutaneous mucormycosis
- No risk factors identified
- No predisposing factors (e.g. local trauma)

- How long would you treat?
- What should guide the duration of treatment?

