A Case of Unintended Consequences –lessons to be learned

Dr Beth White
Consultant Infectious Diseases and Acute Physician, Glasgow

NHS
Greater Glasgow and Clyde

Mrs R

- 67 year old, 1st stage revision of THR, June 2016
  - 1 of 6 samples – CNS on enrichment only
- Daptomycin 8mg/kg
- Peripherally inserted central catheter (PICC) inserted
- 7 days later discharged via OPAT

NHS
Greater Glasgow and Clyde

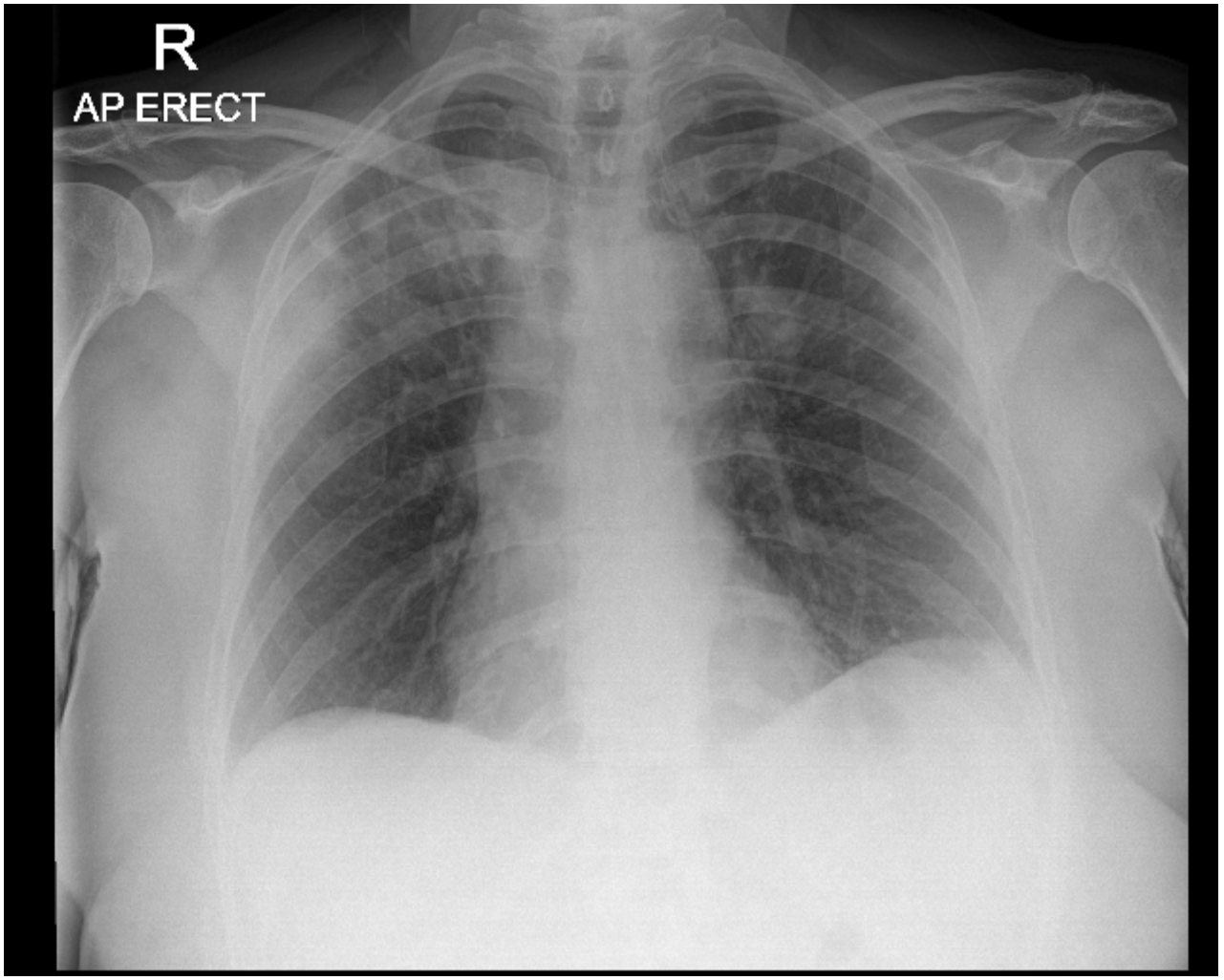
Progress

- 7 days later readmitted rigoring after self-administration of Daptomycin
- PICC cultures – *Klebsiella pneumoniae*

- Line removed, IV temocillin given

- Day 4 – dry cough, hypoxic, new infiltrates on CXR

NHS
Greater Glasgow and Clyde


R
AP ERECT

Assessment / Diagnosis?

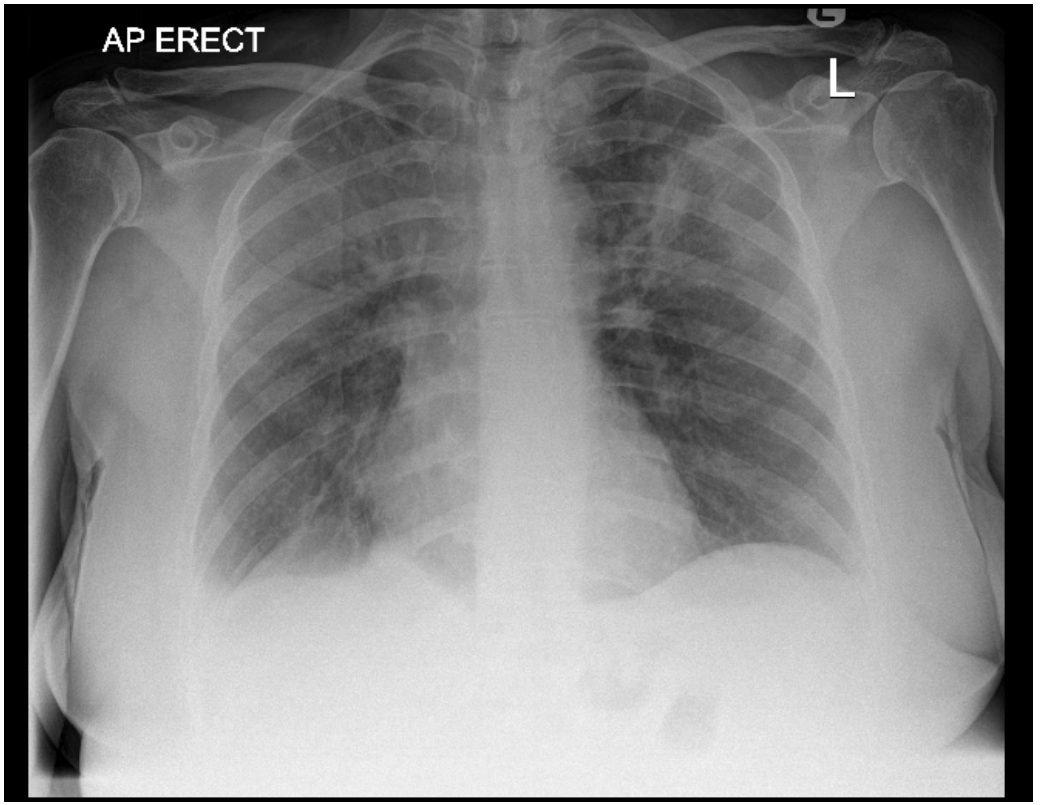
- Sats 91% air, RR 18
- Chest clear
- Bloods
  - WCC 13 (4-11x10+9/l)
    - Neut 11 (2-7.5), Eosinophil count 0.4 (0-0.4)

- Hospital Acquired Pneumonia
  - Amoxicillin / Temocillin
  - (Daptomycin continued for PJI)

NHS
Greater Glasgow and Clyde

Progress

- Deteriorates over the next 9 days
  - Increasingly hypoxic
  - Rising inflammatory markers
  - Eosinophil count 0.7 (10% total WCC)



Diagnosis?

Daptomycin-induced eosinophilic pneumonitis

NHS
Greater Glasgow and Clyde

Daptomycin-induced eosinophilic pneumonitis

NHS
Greater Glasgow and Clyde

Daptomycin-induced eosinophilic pneumonitis

FDA diagnostic criteria:

- Concurrent exposure to Daptomycin
- Fever
- Dyspnoea with increased oxygen requirement or requiring mechanical ventilation
- New infiltrates on chest x-ray or computed tomography scan
- Bronchoalveolar lavage with > 25% eosinophils
- Clinical improvement following Daptomycin withdrawal

NHS
Greater Glasgow and Clyde

Mechanism of Dapto-induced AEP?

- Uncertain
  - ?Dapto acts as antigen, taken up by alveolar macrophages
    - Recruits Th2 lymphocytes – release IL-5 – Eosinophil activation
    - Activated alveolar macrophages secrete eotaxin, which stimulates eosinophil localization to the lungs
  - Dapto binds Surfactant so ?accumulates in alveolar space –epithelial injury/inflammation

NHS
Greater Glasgow and Clyde

Daptomycin-induced AEP – a few extra practice points

- Peripheral eosinophil count?
  - 0.53-2.59 x10^9/l – ie 6-22% of total WCC (normal 0-4%)
- Typical radiographic changes?
  - *Non specific,* but in the few definite cases published:
    - Bilateral changes common
    - Peripheral / mid +/- upper zones
- Dose related?
  - All cases in patients with deep seated infections
  - 6mg/kg, or unknown dose
- Treatment?
  - Cessation of daptomycin
  - Steroids?

NHS Greater Glasgow and Clyde

PICC line infections

NHS
Greater Glasgow
and Clyde

OPAT Outcomes 2001-2010

	Number of events	Rate per 1000 OPAT days
Line-related infection	14 (0.6%)	0.4
Other line-related complications	92 (4.1%)	2.8
Clostridium difficile (within one month)	2 (0.1%)	0.05
ADR	219 (9.8%)	6.7
Unplanned readmission	201 (9.1%)	6.3

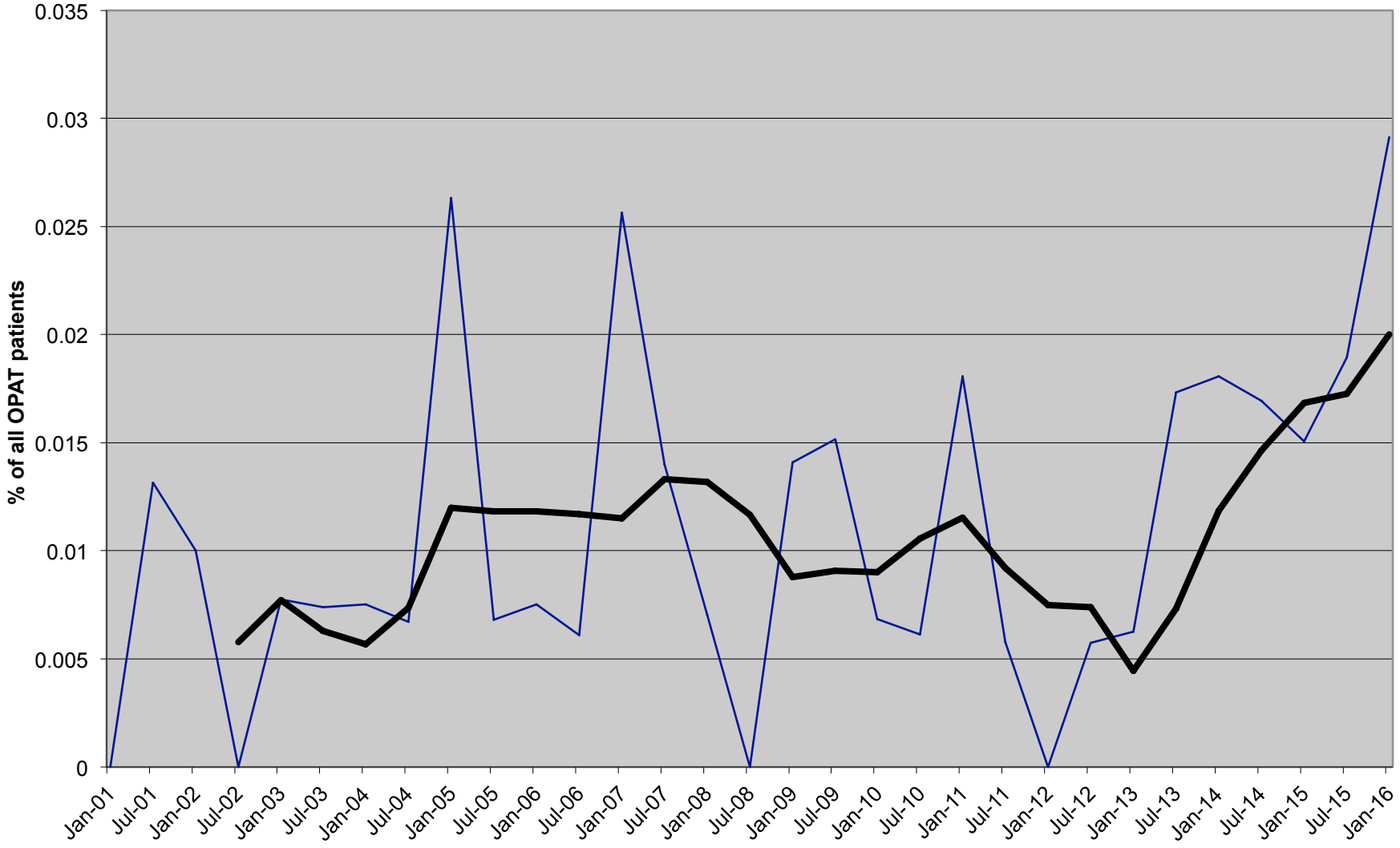
Barr et al Int J Antimicrob Agents 2012; 39:407-413

Independent Risk Factors for Line Complications during OPAT: Importance of IVOST and line type

	OR	P value
Line infection		
Increasing duration of OPAT (44 vs 38 days)	1.0119	0.037
Other line events		
Flucloxacillin vs other	3.00	0.0105
Tunnelled Central line vs Midline	0.0631	0.0001
PICC vs midline	0.2428	0.0272

Barr, EJClinMicID, 2012

OPAT patients readmitted with infection of PICC line (PROVISIONAL DATA)



Data provided by Dr N Ritchie, NHS GGC

Why the rise in PICC infections?

- New PICC device recently introduced
- Delays in discharge via OPAT
  - Prolonged PICC use on wards pre discharge

NHS
Greater Glasgow and Clyde

Risk of PICC infection

Name, Year	Number of PICC / CVC lines	PICC infection rate/1000 catheter days (outpatients)	PICC infection rate/1000 catheter days (hospitalised)	CVC infection rate/1000 catheter days
Safdar, 2005	251 / na		2.1	
Maki DG, 2006	n/a		2.1	2.7
Al Raiy, 2010	622/ 638		2.3	2.4
Chopra, 2013	n/a	0.5		2.1

Actions?

- Concerns raised to local Infection Control team
  - Investigation ongoing
- Vascular access team notified
- Ward sisters notified

NHS
Greater Glasgow and Clyde

Summary

Safe antimicrobial use

- Monitoring and awareness of potential toxicities of drugs used in OPAT

OPAT governance

- Data collection and analysis key to governance within our OPAT services

NHS
Greater Glasgow and Clyde

Questions?

References

Chopra V. Infect Control Hosp Epidemiol. 2013 Sep;34(9):908-18.

Safdar N. Chest. 2005 Aug;128(2):489-95.

Maki DG. Mayo Clin Proc. 2006 Sep;81(9):1159-71.

Al Raiy B. Am J Infect Control. 2010 Mar;38(2) :149-53.