Point Prevalence Survey of Hospital-Acquired Infections & Antimicrobial Use in Ireland

PPS Data Collector Training
April 2017

Presentation 5 – Review of the Patient Form (Form C)
Case Studies 1, 2, 3

Please note that hospital codes MUST be three digits and ward codes MUST be two digits
Letters NOT permitted in ward and hospital codes

Case 1

- Father Christmas, 81 year-old male
- Background: hypertension, benign prostatic hyperplasia
- Admitted to St Elsewhere (hospital code **048**) via ED 08/05/17 following fall and loss of consciousness
- Admitted under general medical team to general medical ward (ward code **02**)
- Medical investigations are ongoing – Transoesophageal echocardiogram day 3, colonoscopy day 6 and he awaits an EEG study
- 20/05/17 (Day 20) acutely unwell following lunch:

Case 1

- 20/05/17: Confused, sweating, distressed
- Temp 38°C, tachypnoea, BP 110/70 PR 100, O_2 sats 88% (room air)
- Respiratory exam - audible crackles right base
- Rest of physical examination unremarkable
- WCC 7.3 x 10^9/L, CRP 106 mg/L
- CXR: consolidation right base
- Sputum: none sent, as patient not expectorating
- Urine: not sent
- Blood cultures taken

Case 1

- Clinical diagnosis by team documented as aspiration pneumonia
- Commenced on – piperacillin/tazobactam 4.5g IV TDS, as per guidelines 20/05/17
- 21/05/17 (Day 21) – Blood cultures positive with Gram-negative bacilli seen
- 22/05/17 (Day 22) – *E. coli* confirmed from blood – Intermediate sensitivity to co-amoxiclav, sensitive to pip/tazo, cephalosporins, and meropenem
- Patient continues on pip/tazo, now day 3 with plan for 8 days treatment documented in notes
- PPS team arrive on ward 02 22/05/17 – Decides from Ward List that Fr Christmas is eligible for inclusion and assigns patient study number/patient ID = **22**
- Fr Christmas has a peripheral cannula *in situ* and no other devices. Of note, he has not had a urethral catheter in the past week.

Case 1

- Complete a Patient Form (Form C) for Fr Christmas
  - Decide if he has an active infection
  - Decide if active infection present, whether it is hospital acquired
  - Decide if active hospital acquired infection, what is the infection and does it meet a HAI case definition
  - Decide if he is receiving antimicrobials

PN – Appendix B P67
RADIOLOGY & PATIENT SYMPTOMS

1.1 PN: PNEUMONIA

Rx

Two or more serial chest X-rays or CT-scans of lungs with suggestive image of pneumonia for patients with underlying cardiac or pulmonary disease*. In patients without underlying cardiac or pulmonary disease, one definitive chest X-ray or CT-scan is sufficient.

and at least ONE of the following

Symptoms

- Fever > 38 °C with no other cause
- Leukopenia (<4000 WBC/mm^3) or leucocytosis (≥ 12 000 WBC/mm^3)

and at least ONE of the following
(or at least TWO if clinical pneumonia only = PN 4 and PN 5)

- New onset of purulent sputum, or change in character of sputum (colour, odour, quantity, consistency)
- Cough or dyspnoea or tachypnoea
- Suggestive auscultation (rales or bronchial breath sounds), rhonchi, wheezing
- Worsening gas exchange (e.g., O_2 desaturation or increased oxygen requirements or increased ventilation demand)

Rx = Radiology

PN reporting instruction:
*For patients with underlying cardiac or pulmonary disease, one definitive CXR or CT scan for the current episode will suffice, provided it may be compared with a previous CXR or CT scan performed within the last 12 months

PN – APPENDIX B P67 MICROBIOLOGY

and according to the used diagnostic method

Microbiology

a – Bacteriologic diagnostic performed by:

Positive quantitative culture from minimally contaminated lower respiratory tract (LRT) specimen **(PN 1)**

- Bronchoalveolar lavage (BAL) with a threshold of $\geq 10^4$ colony-forming units (CFU)/ml or ≥ 5 % of BAL obtained cells contain intracellular bacteria on direct microscopic exam (classified on the diagnostic category BAL).
- Protected brush (PB Wimberley) with a threshold of $\geq 10^3$ CFU/ml
- Distal protected aspirate (DPA) with a threshold of $\geq 10^3$ CFU/ml

Positive quantitative culture from possibly contaminated LRT specimen **(PN 2)**

- Quantitative culture of LRT specimen (e.g. endotracheal aspirate) with a threshold of 10^6 CFU/ml

b – Alternative microbiology methods **(PN 3)**

- Positive blood culture not related to another source of infection
- Positive growth in culture of pleural fluid
- Pleural or pulmonary abscess with positive needle aspiration
- Histologic pulmonary exam shows evidence of pneumonia
- Positive exams for pneumonia with virus or particular microorganism detected: *Legionella spp., Aspergillus spp.*, mycobacteria, *Mycoplasma spp., Pneumocystis spp.*)
  - Positive detection of viral antigen or antibody from respiratory secretions (e.g., EIA, FAMA, shell vial assay, PCR)
  - Positive direct exam or positive culture from bronchial secretions or tissue
  - Seroconversion
  - Detection of antigens in urine (*Legionella pneumophila, Streptococcus pneumoniae*)

c – Others

- **Positive sputum culture or non-quantitative LRT specimen culture** **(PN 4)**
- **No positive microbiology** **(PN 5)**

For pneumonia, only fill one subcategory (where more than one PN definition is met by the patient, prioritise recorded pneumonia definition as: PN1>PN2>PN3>PN4>PN5).

BSI – Protocol P73

1.6 **BSI: BLOODSTREAM INFECTION**

BSI: Laboratory-confirmed bloodstream infection

- **ONE** positive blood culture for a recognised pathogen (e.g., *Staphylococcus aureus, Escherichia coli, Candida albicans* etc.) [If any doubt regarding what constitutes a recognised pathogen, please discuss with microbiologist]

<u>or</u>

- Patient has at least **ONE** of the following signs or symptoms: fever (>38°C), chills or hypotension
  and
  TWO positive blood cultures for a common skin contaminant** (the same organism must have been isolated from two separate blood culture samples, usually taken within a 48 hour period)

**Skin contaminants = coagulase-negative staphylococci, *Micrococcus sp., Propionibacterium acnes, Bacillus spp., Corynebacterium spp.*

BSI Protocol P73

Primary BSI:
Catheter-related BSI: Primary BSI due to infection of either a peripheral vascular catheter (PVC) or central vascular catheter (CVC)
When the same microorganism was cultured from both the blood and the vascular catheter, this is microbiologically confirmed catheter-related BSI (CRI3): CRI3-PVC or CRI3-CVC. See CRI definitions below for further information (See **Appendix D** for algorithm for diagnosis of catheter related-infection).
When the patient has positive blood cultures (one or more sets with a significant pathogen or at least two sets with organism regarded as a skin contaminant) without microbiological confirmation of the same organism from the vascular catheter tip or exit site swab and the patient's symptoms improve within 48 hours after removal of the catheter, this is clinically-diagnosed catheter-related BSI without microbiological confirmation linking the blood culture to the vascular catheter (C-PVC or C-CVC).
Unknown origin (UO): Primary BSI of unknown origin. Not related to vascular catheter infection and not meeting definition of secondary BSI below. Decision to classify as BSI-UO has been verified during the PPS, as no identifiable source was found for that BSI on review of all available information)

Secondary BSI:
BSI arising secondary to an infection elsewhere in the body.
When the same micro-organism was cultured from both the blood and another infection site or strong clinical evidence exists that the patient's BSI developed secondary to another infection site, invasive diagnostic procedure or foreign body.
Pulmonary infection resulting in BSI **(S-PUL)**
Urinary tract infection resulting in BSI **(S-UTI)**
Digestive tract infection resulting in BSI **(S-DIG)**
Surgical site infection resulting in BSI **(S-SSI)**
Skin and soft tissue infection resulting in BSI **(S-SST)**
Other infection not covered by those categories above resulting in BSI **(S-OTH)**
Note: Secondary BSI is reported as a separate HAI, in addition to the primary infection, if the primary infection matches the relevant HAI case definition.

BSI Source Unknown (UNK): No information available about the BSI source or information missing.

Case 2

- Harold Potter, 50 year-old male, previously healthy
- Presents to this ED (hospital code = **048**) 09/05/17 with pain and purulent discharge from surgical site
- Discharged home well from this hospital 08/05/17 following lumbar discectomy 04/05/17
- Admitted from ED under care of neurosurgical team to the neurosurgical ward 10/05/17(ward code **02**)
- Afebrile, systemically well, BP 130/70, heart rate 80
- Surgical site is red, hot with visible pus
- Infection appears confined to skin

Case 2

- Swab taken
- WCC 4.6 x10^9/L, CRP 76.9 mg/L
- 09/05/17 Admitting NCHD documents post-operative wound infection and prescribes flucloxacillin 2gm IV 6 hourly, as per guidelines
- 11/05/17 – Wound swab: positive growth *Staphylococcus aureus* susceptible to flucloxacillin & glycopeptides
- Patient doing well on current therapy
- 13/05/17 changed from IV to oral flucloxacillin 500mg QDS with plan for seven days treatment

Case 2

- PPS team arrive on ward 13/05/17, decide Harold is eligible for inclusion and assign patient ID = **15**
- Harold has peripheral cannula *in situ* and no other devices
- Local empiric antimicrobial policy for surgical site infection treatment advises flucloxacillin

Patient Form (Form C)

- Complete a Patient Form (Form C) for Harold Potter
  - Decide if he has an active infection
  - Decide if active infection present, whether it is hospital acquired
  - Decide if active hospital acquired infection, what is the infection and does it meet a HAI case definition
  - Decide if he is receiving antimicrobials

SSI-S – APPENDIX B P72

1.5 SSI: SURGICAL SITE INFECTION

Superficial incisional (SSI-S)

Infection occurs within 30 days after the operation **and** infection involves only skin and subcutaneous tissue of the incision **and** at least **ONE** of the following is present:

1. Purulent drainage with or without laboratory confirmation, from the superficial incision
2. Organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision
3. At least **ONE** of the following signs or symptoms of infection: pain or tenderness, localised swelling, redness, or heat **and** superficial incision is deliberately opened by surgeon, **unless** incision is culture-negative
4. Clinical diagnosis of superficial incisional SSI made by consultant clinician

Case 3

- Alan Bean, 48 year-old male admitted to this hospital (hospital code **048**) via ED on 08/05/17 under care of urology team
- Discharged two days previously (06/05/17) following eight day admission for COPD infective exacerbation, which included a TRUS-guided biopsy of prostate to investigate elevated prostate specific antigen (PSA) level
- He has severe COPD, type 1 diabetes and history of left forefoot amputation for peripheral vascular disease
- Presents to ED with 24 hour history of dysuria, haematuria (blood in urine), vomiting, abdominal pain and feeling 'hot and shivery'

Case 3
DAY 1: 08/05/17

- Febrile to 39^{o}C, tachycardia heart rate 110, BP 140/90
- Physical examination otherwise unremarkable
- Blood cultures and mid-stream urine (MSU) taken
- MSU: dipstick 3+ leucocytes 3+ blood
- WCC 21 x 10^{9}/L (neutrophilia 18 x 10^{9}/L) CRP 240 mg/L
- Reviewed by urology registrar on-call who documents: sepsis post prostate (TRUS) biopsy
- Commenced empirically on IV co-amoxiclav 1.2gm TDS and IV gentamicin 5mg/kg stat dose, despite local guideline advising pip/tazo & amikacin
- Admitted to general surgical ward (ward code **01**)

Case 3
DAY 2: 09/05/17

- Microbiology inform team that Gram negative bacilli seen in blood cultures taken yesterday
- Admission urine positive for lactose fermenter with further identification and susceptibility results to follow on urine and blood culture
- Not improving, ongoing fevers and tachycardia
- Co-amoxiclav changed empirically to IV piperacillin/tazobactam 4.5gm TDS and second dose of gentamicin given

Case 3
DAY 3: 10/05/17

- *E. coli* isolated from blood cultures and urine – ESBL producing organism
  - Resistant to cefotaxime, piperacillin-tazobactam and ciprofloxacin
  - Sensitive to gentamicin and meropenem
- Piperacillin-tazobactam changed to IV meropenem 1gm TDS on microbiology advice and no further gentamicin given
- Plan is to give IV meropenem for seven days as treatment for urosepsis post TRUS biopsy

Case 3
DAY 7: 14/05/17

- Continues on meropenem
- Develops six episodes of watery diarrhoea and abdominal pain
- *Clostridium difficile* toxin detected in faeces
- Result phoned by microbiologist to intern on-call and treatment advised
- Commenced on oral fidaxomicin 200mg BD by intern on-call, with no documentation of reason in notes

Case 3
DAY 8: 14/05/17

- PPS team arrive on ward, decide that Alan is eligible for inclusion and assign patient study number/patient ID = **07**
- Alan has IV cannula and urethral catheter *in situ*

Patient Form (Form C)

- Complete a Patient Form (Form C) for Alan Bean
  - Decide if he has an active infection
  - Decide if active infection present, whether it is hospital acquired
  - Decide if active hospital acquired infection, what is the infection and does it meet a HAI case definition
  - Decide if he is receiving antimicrobials

UTI
Appendix B P69

1.3 UTI: URINARY TRACT INFECTION

UTI-A: microbiologically confirmed symptomatic UTI

Patient has at least **ONE** of the following signs of symptoms with no other recognised cause: fever (>38°C), urgency, frequency, dysuria, or suprapubic tenderness **and** patient has a positive urine microbiology culture report. That is, ≥ 10^5 microorganisms per ml of urine with no more than two species of microorganisms detected in the same urine sample.

UTI-B: not microbiologically confirmed symptomatic UTI

Patient has at least **TWO** of the following with no other recognised cause: fever (>38°C), urgency, frequency, dysuria, or suprapubic tenderness **and** at least **ONE** of the following:

a. Positive dipstick for leukocyte esterase and/or nitrite
b. Pyuria – White blood cells (WBC) or pus cells seen on urine specimen microscopy with ≥10 WBC/ml or ≥ 3 WBC/high-power field of unspun urine
c. Organisms seen on Gram stain of unspun urine
d. At least two urine cultures with repeated isolation of the same uropathogen (Gram-negative bacteria or *Staphylococcus saprophyticus*) with ≥ 10^2 colonies/ml urine in non-voided specimens
e. ≤10^3 colonies/ml of a single uropathogen (Gram-negative bacteria or *S. saprophyticus*) in a patient being treated with effective antimicrobial agent for a urinary infection
f. Clinician clinical diagnosis of a urinary tract infection
g. Clinician institutes appropriate therapy for a urinary infection

UTI reporting instruction:
For urinary tract infection, only fill in one subcategory (where more than one UTI definition is met by the patient, prioritise urinary tract infection as UTI-A>UTI-B).

CDI Appendix B P78

1.9 GI: GASTROINTESTINAL SYSTEM INFECTION

GI-CDI: *Clostridium difficile* infection

Clostridium difficile infection must meet at least **ONE** of the following criteria:

1. Diarrhoeal stools or toxic megacolon **and** a positive laboratory assay for *C. difficile* toxin A and/or toxin B in stools **or** toxin-producing *C. difficile* detected in stool via culture, PCR or other means
2. Pseudomembranous colitis revealed by lower gastro-intestinal endoscopy
3. Colonic histopathology characteristic of *C. difficile* infection (with or without diarrhoea) on a specimen obtained during endoscopy, colectomy or post mortem

NOTE: If clinical signs of *Clostridium difficile* infection appear within 28 days after hospital discharge period, GI-CDI must be defined as hospital-acquired infection (HAI)

GI-CDI reporting instruction:
If you report CDI as a HAI, don't forget to also report *C. difficile* as the causative microorganism using MO-code CLODIF. The only circumstance where CLODIF would not be reported would be if the patient's CDI was diagnosed only on the basis of findings of pseudomembranous colitis at endoscopy or colectomy without a positive microbiological result for *C. difficile* toxin.

Any Questions?

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