

# Case presentation & tygacil (tigecycline) usage

## Case I–Mr. Rassam

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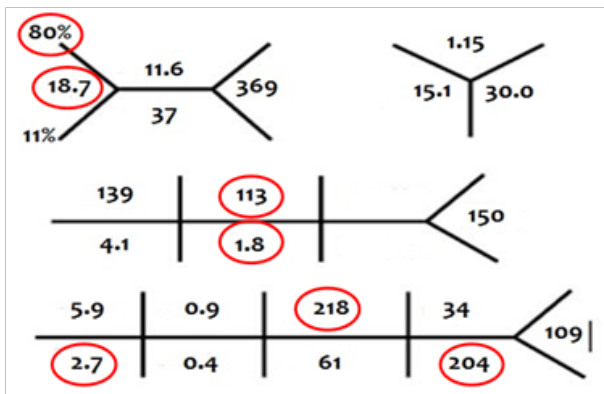
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- a) 24 year’s old, male, and medically free, from Yemen.
- b) Admitted on 8/4/2014
  - i. With a 1-month Hx. of Gunshots to Chest/Abdomen that was operated on in Yemen.
  - ii. After 1-month post laparotomy Lt Nephrectomy Splenectomy Rt Nephrostomy Tracheostomy patient.
  - iii. Was treated with unknown medications & unknown antibiotics.

### O/E

- I. CAO\* 3
- II. Temp 37.5 – Pulse 125/m – RR 16/m – BP 123/70 – O2% 97%
- III. Ill Looking, cachectic, Pale, Jaundiced.
- IV. Tracheostomy *in situ*.
- V. Bilateral Harsh Breathing Sounds Decreased AEB.
- VI. Soft Abdomen with previous midline incision of previous surgery & 3 drains:-
  - i. Lt UQ à Bile
  - ii. Rt Loin à Urine
  - iii. Lt Loin à Empty Figure 1 & Table 1

Additional Admission Labs



**Figure 1** Soft Abdomen with previous midline incision of previous surgery.

### Chest+abdomen+pelvic CT scan (oral contrast)

- i. Bilateral pleural effusion & more on RT side associated with atelectasis & ground glass opacities bilaterally with peri-bronchial thickening & LT fissural effusion.
- ii. Translucent tubular shadow from LT lung extending to the SC tissue (fistula). Drainage tubes in upper abdomen (1<sup>st</sup> one @ porta

hepatis, 2<sup>nd</sup> one @ sub diaphragmatic region).

- iii. Ascites.
- iv. Double J Catheter in RT Kidney -UB.

### Management of case

- i. NPOIV Fluids (Resuscitation)
- ii. TPN Protocol
- iii. I/O Charting
- iv. Bld Urine Sputum Nasal Cx
- v. Labs & Radiology (CXR+ Pan CT Scan Nephrostogram)
- vi. Pre-Op assessment & evaluation (PRBCs FFP)
- vii. Contact Isolation
- viii. IV Medications (Tygacil Meropenem Diflucan Nexium Clexane Hydrocortisone Perfalgan)

**Table 1** Admission labs

| Lab       | Value         | Lab            | Value        |
|-----------|---------------|----------------|--------------|
| CRP       | 58.9 ↑        | Urine Analysis | Prt+1        |
| ESR       | 44 ↑          |                | Glu+3        |
| PO4       | 4.3           |                | Bld+3        |
| Mg        | 1.42 ↓        |                | Pus-Numerous |
| Ca        | 9             |                | Red-Numerous |
| Nasal Cx  | Acinetobacter | Bld Cx         | -ve          |
| Sputum Cx | Acinetobacter | Urine Cx       | -ve          |

### Consultations to

- i. Cardiologist
- ii. Nephrologist

- iii. Pulmonologist
- iv. Urologist Surgeon
- v. Infectious Disease Specialist

#### **10/4/2014 (2 days post admission)**

#### **1st Surgery (Redo exploratory laparotomy with LT thoracotomy approach)**

- i. LT Lung decortications LT Lung Bullet injury repair.
- ii. Gastro-Pleuro-Cutaneous Fistula excision.
- iii. Primary repair (double layer) of stomach.
- iv. LT hemicolectomy End Ileostomy formation.
- v. Feeding Jejunostomy Tube Insertion.
- vi. Pancreatic Necrosectomy.
- vii. LT Chest Tube 2 free abdominal drains insertion.

#### **10/4/2014 (2 days post admission)**

#### **1st Surgery (Urology Surgery)**

- i. RT Ureteroscopy
- ii. DJ Insertion

#### **Post Op Day (0) to Day (3)**

- i. Patient transferred back to ICU-Surgical with same pre-op management.
- ii. Patient started on Enteral feeding by (Jejunostomy tube) with ensure milk.
- iii. Patient remained (Tachycardiac+Feverish).

#### **Post Op day (4)-14/4/2014**

- i. We discovered wound dehiscence with fluid discharge from abdominal wound.
- ii. 2<sup>nd</sup> Surgery (2<sup>nd</sup> laparotomy+Wound Repair with Component separation closure technique).
- iii. Tissue Cultures obtained & (+ve for Staphylococcus spp–Coagulase Negative) & ONLY sensitive to tigecycline.

#### **Post Op day (4)-14/4/2014**

- i. Patient transferred back to ICU-Surgical Intubated on Ventilator (atelectasis of LT lung & poor expansion with bad ABG's).
- ii. Patient kept on same protocol (IV Fluids TPN Protocol Enteral feeding I/O Charting IV Medications (Tygacil Meropenem Diflucan Nexium Clexane Perfalgan).
- iii. We added (Octreotide) to our list of medications for 5 days.
- iv. Patient remained (Tachycardiac Feverish).

#### **Post Op day (10)-20/4/2014**

- i. We discovered (by clinical & radiological evidence) a leak at the site of feeding Jejunostomy tube.

- ii. 3<sup>rd</sup> Surgery (laparotomy+Repair).
- iii. Same Pre-Op management but stopped the enteral feeding for few days.
- iv. Patient remained (Tachycardiac+Feverish).

#### **Post op day (18)-28/4/2014**

- i. Patient fully extubated with Spontaneous Breathing after several trials over the past few days.
- ii. Multiple interval blood & other Cx came back –ve.
- iii. Oral fluid feeding resumed for the 1<sup>st</sup> time from initial trauma with success.
- iv. Vital signs were near NORMAL for 48hours.
- v. Patient was able to ambulate for 1<sup>st</sup> time from initial trauma.

#### **Post op day (19)-29/4/2014**

- i. Ventilator stopped & Tracheostomy removed.
- ii. Tygacil with Meropenem stopped & patient Started on Piperacillin/Tazobactam.
- iii. Kept on Vancomycin.
- iv. Stopped feeding by Jejunostomy tube.
- v. Kept in ICU–Surgical with oral fluid feeding & observation of multiple spikes of fever & Tachycardia.

#### **Post op day (23)-03/05/2014**

- i. Jejunostomy feeding tube removed.
- ii. CT Chest/Abdomen/Pelvis (Normal Study).
- iii. Kept in ICU – Surgical with oral fluid feeding & observation of multiple spikes of fever & Tachycardia.

#### **Post op day (24)-04/05/2014**

- i. Non ionic contrast meal (Normal Study).

#### **Post op day (27)-07/05/2014**

- i. Piperacillin/Tazobactam changed to Tienam.
- ii. TPN stopped & Full regular diet given.
- iii. CT Pulmonary Angio done (Normal Study).
- iv. Kept in ICU–Surgical with oral fluid feeding & observation of multiple spikes of fever & Tachycardia.

#### **Post op day (32)-12/05/2014**

- i. Patient transferred to floor.
- ii. Regular diet (High Protein) & Oral medications.
- iii. Fully ambulating.

#### **Post op day (44) - 24/05/2014**

- i. Patient discharged home.
- ii. Patient came back to near normal level of activity & independence.

- iii. V/S was normal for >48hrs.
- iv. WBC & CRP went down to near normal levels.
- v. All Cx came back –ve.
- vi. All Radiological Studies came back as normal studies.

### Case 2–Mr. Qannaff

- i. 20 year’s old, male, and medically free, from Yemen.
- ii. Admitted on 04/02/2014–NO formal Hx – Per Reports
- iii. With a 1-week Hx. of High Velocity Gunshots to Abdomen that was operated on in Yemen.
- iv. After 1-week post laparotomy+2 drains found inside abdominal cavity with multiple visceral injuries (liver/pancreas/duodenum/gastric/IVC vs. Portal??).
- v. Was treated with unknown medications & unknown antibiotics.

#### O/E

- i. CA but disoriented.
- ii. Paraplegic
- iii. Temp 37.2–Pulse 120/m–RR 31/m–BP 132/90–O<sub>2</sub>% 98%
- iv. Ill looking, cachectic, Pale but NOT Jaundiced.
- v. Bilateral Harsh Breathing Sounds+Decreased AE @ Basal Rt.
- vi. Tender Abdomen+previous midline incision of previous surgery+bullet inlet @ RT Para midlineoutlet @ LT lumbar & 2 drains:-

Rt loin à Bile

Rt Loin à Bile Figure 2 & Table 2

Additional Admission Labs



Figure 2 Tender Abdomen+previous midline incision of previous surgery+bullet inlet @ RT Para midlineoutlet @ LT lumbar.

#### Chest+abdomen+pelvic CT scan (triple contrast)

#### Lumbosacral MRI

- i. L2 vertebral fracture with injury to cord.

Table 2 Admission labs

| Lab       | Value | Lab            | Value        |
|-----------|-------|----------------|--------------|
| Mg        | 1.9 ↓ | Urine Analysis | Prt+1        |
| Ca        | 7.4 ↓ |                | Glu+1        |
|           |       |                | Bld+4        |
|           |       |                | Pus-4 -6     |
|           |       |                | Red-Numerous |
| Nasal Cx  | ESBL  | Bld Cx         | -ve          |
| Sputum Cx | ESBL  | Urine Cx       | -ve          |

#### Management of case

##### Intubation+Full sedation

- i. NPOIV Fluids (Resuscitation)
- ii. TPN Protocol
- iii. I/O Charting
- iv. Bld Urine Sputum Nasal Cx
- v. Labs & Radiology (CXR+Pan CT Scan)
- vi. Pre-Op assessment & evaluation (PRBCs FFP)
- vii. Contact Isolation
- viii. IV Medications (Meropenem Nexium Clexane)

##### Consultations to

- i. Neurosurgeon
- ii. Pulmonologist
- iii. Infectious Disease Specialist
- iv. ENT Surgeon

#### 05/02/2014 (1 days post admission)

- i. 1<sup>st</sup> Surgery (Exploratory laparotomy) with
- ii. Resection of distal stomach duodenum head of pancreas.
- iii. Retroperitoneal exploration & evacuation of multiple bilomas.
- iv. CBD Tube drainage.
- v. 2 free abdominal drains inserted with 2 VAC dressings.
- vi. Multiple packs inserted.
- vii. Findings (Type V complex pancreatic–duodenal injuries).

#### Post Op day (0) to day (2)

- i. Patient transferred back to ICU-Surgical with same pre-op management.
- ii. Blood transfused with FFP in regular basis.

- iii. Vancomycin added to Rx regimen.
- iv. Sandostatin added to Rx regimen.
- v. Clexane changed to Hibor.
- vi. Patient remained (Tachycardiac Feverish).

#### Post Op day (3)-08/02/2014

- i. 2<sup>nd</sup> Surgery (Laparotomy+Removal of Packing+Gastrojejunostomy + choledochojejunostomy + pancreaticojejunostomy).
- ii. Patient transferred back to ICU-Surgical Intubated on Ventilator.
- iii. Patient kept on same protocol (IV Fluids+I/O Charting+IV Medications (Meropenem+Vancomycin+Nexium+Hibor).
- iv. Patient remained (Tachycardiac+Feverish).

#### Post Op day (7)-12/02/2014

- i. 3<sup>rd</sup> Surgery (Wound Exploration+Debridement+Dressing+Removal of VAC Dressing).
- ii. Sputum Cx (+ve for Acinetobacter)

#### Post Op day (11)-16/02/2014

- i. 4<sup>th</sup> Surgery (Wound Exploration+partial closure with vicryl mesh+component separation technique).
- ii. D/C drains (2)

#### Post Op day (13)-18/02/2014

- i. 5<sup>th</sup> Surgery (Exploratory Laparotomy+Retroperitoneal drainage of subpancreatic fluids+Dressing+progressive closure).
- ii. Tissue Cx (+ve for Acinetobacter)
- iii. Colistin added to the Rx regimen.
- iv. Extubated on O<sub>2</sub> mask.
- v. Patient remained (Tachycardiac+Feverish).

#### Post Op day (15)-20/02/2014

- i. Patient started on (Ensure Milk by NGT+Apple Juice).

#### Post Op day (17)-22/02/2014

- i. 6<sup>th</sup> Surgery (Closure of abdominal wall).
- ii. Blood Cx (+ve for Acinetobacter) & Tygacil added to the Rx regimen.
- iii. Re-intubated due to Respiratory Distress.

#### Post Op day (18)-23/02/2014

- i. Enteral feeding started.
- ii. D/C Chest Tube.
- iii. Meropenem stopped.
- iv. Flagyl added to the Rx regimen.
- v. Patient remained (Tachycardiac+Feverish).

#### Post op day (20)-25/02/2014

- i. 7<sup>th</sup> Surgery (Wound lavage under GA+Dressing).
- ii. CXR à white LT lung due to collapse.
- iii. Patient is still intubated.
- iv. Blood Cx (-ve).
- v. Sputum Cx (+ve Acinetobacter).
- vi. TPN Started.
- vii. Patient remained (Tachycardiac+Feverish).

#### Post Op day (22)-27/02/2014

- i. Trial of Extubation à Failed.
- ii. 8<sup>th</sup> Surgery (Tracheostomy+DUGA).

#### Post Op day (24)-01/03/2014

- i. D/C Ventilator.
- ii. V/S was normal for >48hrs.
- iii. All Cx came back –ve.

#### Post op day (26) - 03/03/2014

- i. Patient discharged to Yemen, AMA by MEDEVAC.
- ii. Patient is considered a HIGH risk for non-professional management with risk of death but AMA.

#### Why tygacil?

- i. Tygacil (tigecycline) has *in vitro* activity against a wider range of pathogens
- ii. Resistant Gram +v: *Enterococcus faecalis* (VRE), *Enterococcus faecium* (VRE), *Staphylococcus aureus* (MRSA), *Staphylococcus epidermidis* (MRSE)
- iii. Resistant Gram –ve: *Acinetobacter baumannii*, *E. Coli*, *Klebsiella pneumoniae*, *Stenotrophomonas maltophilia*, Tygacil is not affected by (ESBLs).
- iv. Atypicals: New- Legionella pneumophila.

#### Tygacil (tigecycline) has in vitro activity against a wider range of pathogens

- i. Anaerobes: *Bacteroides (distasonis, fragilis, ovatus, thetaiotaomicron, uniformis, vulgatus)*, *Clostridium perfringens*, others.
- ii. Gram +ve: *Enterococcus (avium, casseliflavus, faecalis, faecium, gallinarum)*, *Staphylococcus (aureus, epidermidis, haemolyticus)*, *Streptococcus (pyogenes, agalactiae, anginosus grp)*.
- iii. Gram –ve: *Aeromonas hydrophila*, *Citrobacter (freundii, koserr)*, *Enterobacter (cloacae, aerogenes)*, *E.Coli*, *Klebsiella (oxytoca, pneumoniae)* *Serratia marcescens*, *Pasteurella multocida*.

#### Tygacil (tigecycline) has in vitro activity against a wider range of pathogens

- i. Gram +ve: New-*Streptococcus Pneumoniae*, including cases with concurrent bacteremia

- ii. Gram -ve: New-*Haemophilus influenzae* & *Parainfluenzae* (Figure 3 & Table 3).

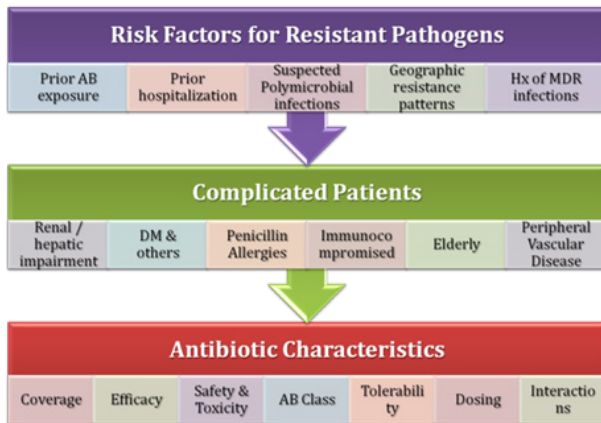


Figure 3 IV Antibiotic choice.

**Why Tygacil?**

- i. Clinical coverage: Expanded broad-spectrum coverage including resistant gram positive, resistant gram negative, and anaerobes
- ii. Efficacy: Proven as empiric mono therapy in patients with cIAI.
- iii. Dosing Regimen: Does not require dosage adjustments for patients

Table 3 Admission labs

|             | Tygacil | 3 <sup>rd</sup> 4 <sup>th</sup> Cephalosporin | Carbapenems | Fluroquinolones | Pipa/Tazo |
|-------------|---------|---|-------------|-----------------|-----------|
| Gram +ve    | √       | √   | √           | √               | √         |
| Gram -ve    | √       | √   | √           | √               | √         |
| Atypicals   | √       | 0   | 0           | √               | 0         |
| Anaerobes   | √       | 0   | √           | 0               | √         |
| R. Gram +ve | √       | 0   | 0           | 0               | 0         |
| R. Gram -ve | √       | 0   | √           | 0               | 0         |
| Pseudomonas | 0       | 0   | √           | 0               | √         |

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None.

**Conflict of interest**

The author declares no conflict of interest.

- with renal impairment regardless of severity. No adjustments with mild-to-moderate hepatic impairment.
- iv. Drug Interactions: Low potential for drug-drug interactions
- v. Results: Efficacy in treatment
- vi. Convenient: Q 12hr dosing

**2009 Infectious diseases society of america guidelines for treatment of cIAI**

**Optimal dosing:** To ensure maximum efficacy & minimal toxicity & to reduce antimicrobial resistance, for empiric Rx of cIAI, guidelines suggest 100mg initial dose of tigecycline, followed by 50mg every 12hrs.

**cIAI: community acquired infections:** Guidelines recommend tigecycline as single-agent Rx for initial empiric Rx in adults with infections of mild-to-moderate severity & perforated or abscessed appendicitis.

**Treatment duration:** a) According to guidelines, antimicrobial therapy should be limited to 4-7days, unless it is difficult to achieve adequate source control.

- i. The recommended duration of Rx with Tygacil for cIAI is 5 to 14days.