"Switch to oral" campaign – Early conversion of IV to oral antibiotics

Dr. Tan Kit Mun
Consultant Geriatrician
UMMC

Team members: Dr. Chong Kim Yeong MBBS (UM)
              Ms Sophie Adams – Elective medical student Edinburgh
              A/P Dr Tan Maw Pin – Cons. Geriatrician

Duration of initiation of project and data collection

- 7 weeks from 27th October to 9th December 2016

- Location: Geriatric Medicine Ward in UMMC
  - Acute medical ward with rehabilitation facilities on site

- 30 beds – average age of inpatients 80, frailest and oldest patients in hospital
  - 2 single rooms, 4 double rooms and 5 rooms with 4 patients

- The practice of "Switch to Oral" antibiotics continues on the ward

Problem outline

- Prolonged use of broad-spectrum IV antibiotics can increase the rate of antimicrobial resistance (AMR) and multi-drug resistant organisms (MDRO) in an institution.

- Older people are more susceptible to iatrogenic events related to IV antibiotic treatment and also likely to suffer more severe morbidity and mortality with MDRO related infections
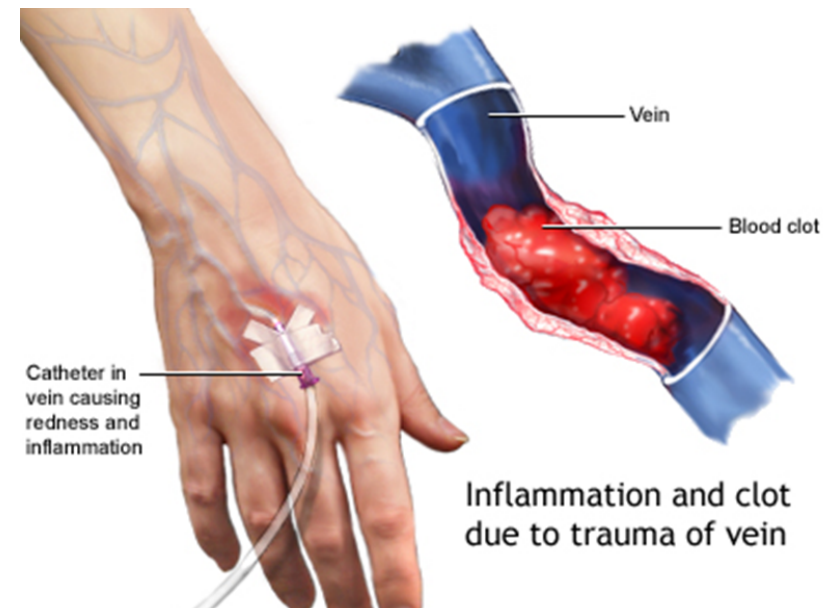
Background studies in UMMC geriatric medicine ward January to February 2015

- 80% of all patients admitted were on antibiotics at some point of their stay.

- 15% of the patients on antibiotics (12% of all admissions) had positive microbiological cultures for MDRO.

- This high percentage is likely to be related to several factors including
  - prolonged usage of broad-spectrum IV antibiotics, leading to selection of antibiotic resistant organisms
  - environmental factors on the ward including lack of single rooms for isolation and contact precautions
  - A high percentage of complex readmissions post recent discharge from hospital (HAI)
  - Take-over of complex inpatients from different areas of the hospital for rehabilitation

Background studies in UMMC geriatric medicine ward Jan to Feb 2015

- 54% of older patients suffered an adverse event related to IV cannulation during their inpatient stay
  - Thrombophlebitis
  - Pain
  - Extravasation of infusate

Catheter in vein causing redness and inflammation

Vein

Blood clot

Inflammation and clot due to trauma of vein

Possible benefits of an Early "Switch to Oral" Antibiotics Campaign

- The above studies therefore point to possible benefits of an early appropriate conversion from IV to oral antibiotics [1,2], which are expected to include reduction in
  - prevalence of MDRO
  - length of stay [3-6]
  - cost of treatment [4-7]
  - labour requirements in preparation of IV therapy
  - Iatrogenic events related to extravasation of IV infusate

  AND
  - increased comfort and earlier/easier mobilisation of patients

Introduction and Implementation of Early "Switch to Oral" Campaign on the Geriatric Medicine Ward - Methods

- At the beginning of October 2016, CME sessions for the current doctors on the ward
  - Consultants
  - Specialists in training
  - Medical Officers
  - Housemans
- Ward sister was informed to advise large team of nurses about the project
- All parties appeared receptive to idea

Criteria of patients suitable for early conversion to oral

- Clinically stable with improving symptoms
- Temperature ≤38 degrees Celcius on two consecutive measurements within 24 hours
- White cell count < 11×10^9/L
- Patient has functioning gastrointestinal tract and safe swallow or working feeding tube
- The oral equivalent antibiotic has good oral/enteral bioavailability

Patients unsuitable for Early "Switch to Oral"

- With infections such as meningitis, deep-seated abscess, empyema, joint/bone infections, infective endocarditis and bacteraemia
- Who are immunocompromised
- Who have gastrointestinal dysfunction/ malabsorption or "nil by mouth"

Reminders for "Switch to Oral"

- Medical elective student reviewed case notes and put in little stickers on drug kardex for "Switch to Oral?" if patient fulfilled criteria
- Posters on the ward
- Doctors when rounding to decide

IV TO ORAL ANTIBIOTIC SWITCH

IV antibiotic therapy should be re-assessed after 48-72 hours in order to *SWITCH* to oral or NG therapy as soon as possible.

Consider early IV to oral switch if:

✔Symptoms improving & patient is clinically stable
✔Temperature ≤ 38°C on 2 consecutive measurements over 24 hours
✔WCC normalising (< 11×10^9/L)
✔Patient has functioning GI tract and safe swallow or has working NG tube
✔Antibiotic has good oral bioavailability

Don't switch if the patient:

✗Has an infection such as meningitis, +ve blood cultures, endocarditis, bone/joint infections, deep- seated abscess or empyema

✗Is immunocompromised

✗Has a GI dysfunction or is "nil by mouth"

WHY?

- Equal efficacy
- Reduced risk of complications
- Increased patient mobility and comfort
- Reduced risk of multidrug resistant organism development
- Reduced IV insertions
- Reduced time-consuming preparation, administration and monitoring
- Significant cost savings
- Earlier patient discharge

Data collection by Medical students for the period of two months

- Patients basic demographics
- Details of hospital admission
- Indication for antibiotics
- Percentage of patients with MDRO cultured
- Length of time on antibiotics

Outcome measures

- Comparison of

- Average length of stay of patients on antibiotics before and after implementation of this campaign

- Percentage of patients with MDRO before and after implementation of this campaign

Results of 2016 switch to oral campaign – brief patient demographics and outcomes

- 123 patients were admitted
- Mean age 80.5 (±7) years and 57% were female
- 9 (7%) were nursing home residents
- 33 (26.8%) were discharged from hospital in the previous month (readmissions)
- 14 (11%) died in hospital

INPATIENT

Results – Antibiotics prescription pattern (1)

- 100 (81%) of patients were on antibiotics
- 202 episodes of antibiotic prescription

- Average LOS of patients on antibiotics was 18±15 days vs no antibiotics 12±12 days

- Average length of time of a patient on one type of antibiotic was 6 days and on any type of antibiotics was 12 days

Indications for antibiotics prescription

Indications for antibiotics (site of infection)	Percentage of patients
Respiratory tract	67.7%
Urological	19.1%
Skin and tissue	12.0%
Septicaemia of unknown origin	11.2%
Intra-abdominal	6.4%
Cardiovascular system	1.6%
Bone and Joint	0.8%
Surgical prophylaxis	0.8%

Results – antibiotics prescription

Number of types of antibiotics received	Percentage of patients
1 type	43%
2 types	26%
3 types	22%
4 types	6%
5 types	3%

Results – Antibiotic prescription Pattern (2)

Antibiotics	Frequency of prescription
amoxicillin-clavulanate	29.2%
piperacillin-tazobactam	23.3%
azithromycin	17.9%
ceftriaxone	12.4%

Microbiological sample results
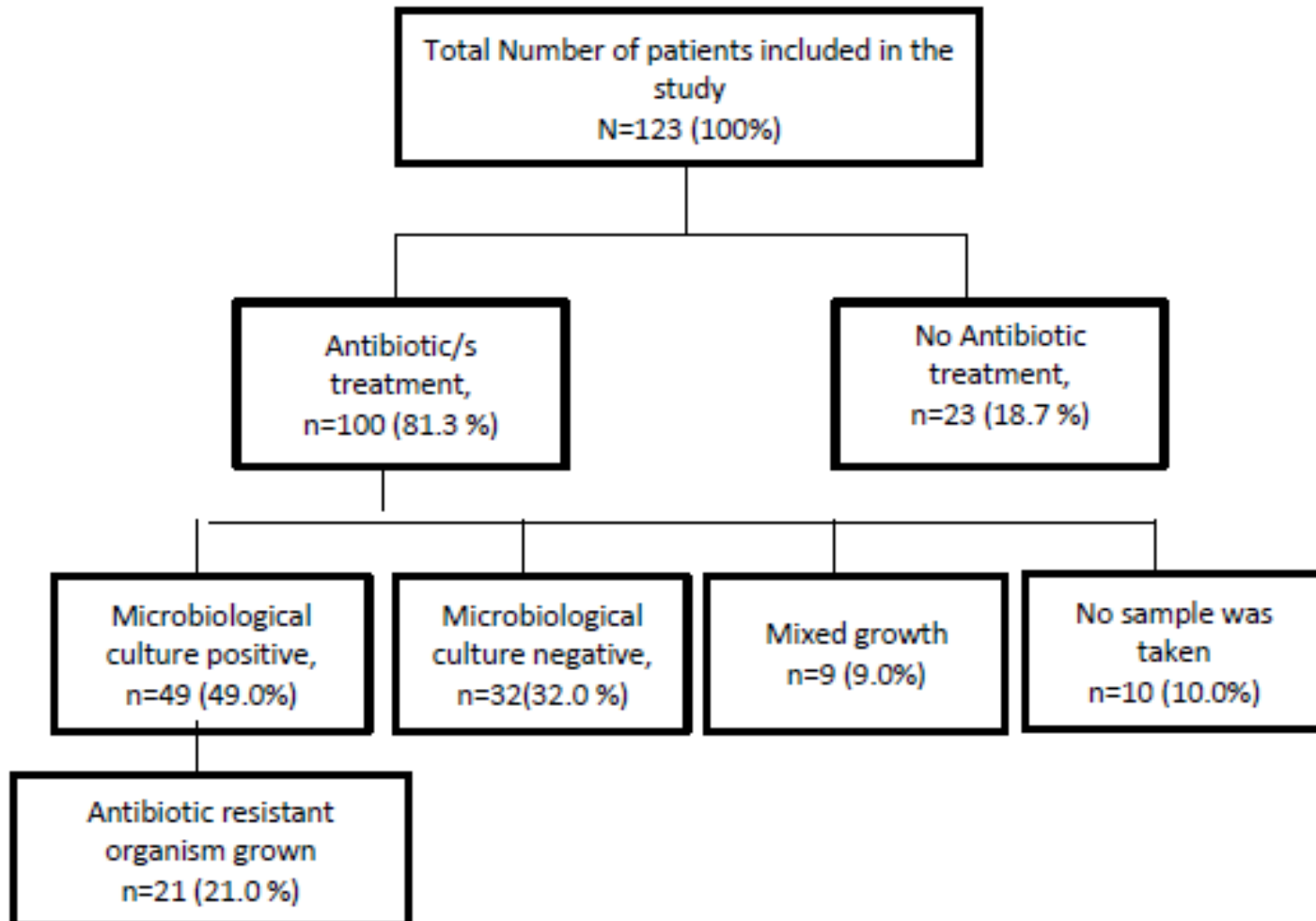
Resistant organisms grown

- 29 incidences of MDRO in 21 patients
- 21/123 (17%) of all patients admitted had MDRO
- 21/100 (21%) of patients on antibiotics had MDRO
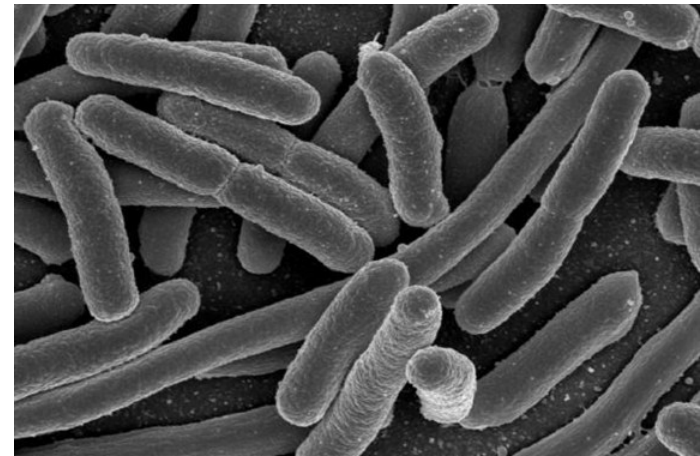
Antibiotics Resistant Bacteria	Type of bacteria	n	%
KLEBSIELLA PNEUMONIAE	Gram negative rod	7	24.1
ESCHERICHIA COLI	Gram negative rod	6	20.7
STAPHYLOCOCCUS AUREUS	Gram positive coccus	4	13.8
ACINETOBACTER BAUMANNII	Gram negative rod	3	10.3
PSEUDOMONAS AERUGINOSA	Gram negative rod	2	6.9
CORNYBACTERIUM SPECIES.	Gram positive rod	1	3.4
ENTEROCOCCUS FAECALIS	Gram positive coccus	1	3.4
MORGANELLA MORGANII	Gram negative rod	1	3.4
PROVIDENCIA STUARTI	Gram negative rod	1	3.4
STENOTROPHOMONAS MALTOPHILIA	Gram negative rod	1	3.4
		29	100.0

Comparison of patients 2015-2016

Characteristics	2015	2016
Gender	N= 118	N= 123
Female, n (%)	74 (62.7)	70 (56.9)
Male, n (%)	44 (37.3)	53 (43.1)
Age, years ± SD	80.2 ± 7	80.5 ± 7
Number of Nursing Home Resident, n (%)	17 (14.4)	9 (7.3)
Number of patient discharged from hospital previous month, n (%)	17 (14.4)	33 (26.8)
Patients who died in hospital, n (%)	12 (10.2)	14 (11.4)
Patients discharged alive from hospital, n (%)	106 (89.8)	109 (88.6)
Patients who were prescribed antibiotics	94 (80%)	100 (81%)
Patients who had Oral Abx switch (n=96; 100)	22 (22.9)	26 (26.0)
Mean length of hospital stay for patients discharged alive, days ± SD	15.7 ± 11	16.8 ± 15
No antibiotic treatment group	12.2 ± 9	11.7 ± 12
Receiving Antibiotic treatment group	16.6 ± 11	18.0 ± 15
Have Oral Antibiotic Switch	16.7 ± 10	16.6 ± 14
Patients who had MDRO	14 (12%)	21 (17%)

Discussion

- No significant differences in % of MDRO and also LOS of patients
- Not unexpected – MDRO and LOS is multifactorial
- MDRO rates affected by
  - Readmissions of complex patients
  - Transfers of complex patients from other wards
  - Facilities for infection control
  - Hand hygiene compliance
  - Environmental factors and cleaning

Discussion

- LOS affected by
  - Complexity of patients illness
  - Carer training and equipment and suitable setting for discharge (eg home vs nursing home)
  - Lengthened by complications like Healthcare Associated Infections, pressure ulcer formation, delirium etc

Challenges in implementation and continuation of "Switch to Oral" campaign

- Junior medical staff rotates on a monthly basis – medical officers and housemans, insufficient pharmacist manpower to review each patients case to remind doctors with the stickers
  - Consultants (constant), specialists (9 months to one year) and nurses can carry on initiative and orientate and remind junior staff
- Weekend review by staff not familiar with the patient, so "switch to oral" delayed by a few days
  - Needs forward planning and handover to weekend review staff

Challenges in implementation and continuation of "Switch to Oral" campaign

- Patients are clinically better in terms of pyrexia and physiological observations
- But their oral intake remains poor with
  - nausea and poor appetite,
  - swallow problem,
  - delirium
- They may not comply with swallowing of tablets
- We aim to avoid NG tubes where possible
  - Antibiotics that may be in liquid form or crushable to mix with food (need to check that bioavailability not altered by food)
  - Manage nausea, constipation and hydration to help with oral intake and appetite

Other measures on the ward for reduction of MDRO and antibiotic stewardship

- Junior staff reminded to follow hospital antibiotic guidelines
- Therapy to be tailored (escalated or deescalated) according to culture results
- Length of time on antibiotics to be as short as possible, eg uncomplicated UTI
- Regular review of IV cannulae to reduce risk of thrombophlebitis and cellulitis around iv cannulae

Other measures on the ward for reduction of MDRO and antibiotic stewardship

- Ward reorganised to have 6 single rooms and the bigger rooms with 3 patients only instead of 4 patients (late Dec 2016)
- Alcohol handrubs at entrance of ward and to two sides of ward, every room entrance and end of bed
- Cleaning of equipment between patients
- Hand hygiene and infection control champion

Summary

- Other "Switch to Oral" campaigns had been found to be effective in reducing length of stay and cost of hospitalisation and possibly rates of MDRO

- Although this small study did not see a significant impact on outcomes in a short period of time, the switch to oral initiative will continue in our geriatric medicine ward in conjunction with other initiatives, as part of overall antibiotic stewardship and also reduction of MDRO occurrences

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