Audit for Vancomycin Prescribing and Administration Habits in Clostridium Difficile (*C. difficile*) Infection

Sunderland Royal Hospital, SR47TP

Author: Mohamed Elarabi, Pre-registration Pharmacist.

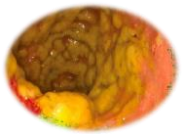
Supervisor: Rachel Bruce, Antimicrobial Specialist Pharmacist.

NHS
South Tyneside and Sunderland
NHS Foundation Trust
STSFT

Audit Background

C. difficile are gram-positive spore-forming anaerobic bacteria, which despite being a human microbiome species, their outgrowth could induce complications such as dehydration, toxic pseudomembranous colitis (AAC), toxic megacolon, and colon perforation [1,2].

Gram Stained *C. difficile* [3]



***C. difficile* AAC** [4]

The microbiological diagnosis of *C. difficile* infection (CDI) is guided by the following tests:

- Culture Test: Identifies the physical bacterial presence.
- Glutamate Dehydrogenase (GDH): Identifies *C. difficile* antigen.
- Faecal *C. difficile* Toxin: Identifies the presence of A&B toxins in patient's stool.

A patient is CDI microbiologically positive, if they have either positive GDH test or culture test, along with positive faecal toxins at the same time.

Example For GDH, Toxin A, Toxin B Test Kits [5]

A Chromogenic Medium For *C. difficile* [6]

According to the local guideline [2], non-complicating CDI is managed by oral vancomycin 125mg four times daily while awaiting for microbiological confirmation in suspected patients.

Public Health England (PHE) recommends 10-14 days of vancomycin therapy in microbiologically confirmed patients; local trust guideline is to give vancomycin therapy for 10 days only [1,2,7,8].

Audit Objectives

This audit was carried out to evaluate two aims, which are:

I. Vancomycin prescribing for CDI follows the trust guideline:

a) 100% of suspected patients had either GDH or culture tests.
b) 100% of GDH/culture-positive patients had faecal toxin test.
c) 100% of suspected patients had vancomycin stopped after a negative faecal toxins.
d) 100% of toxin-positive patients were prescribed oral vancomycin for 10 days.

II. Vancomycin administration for CDI follows the trust guideline:

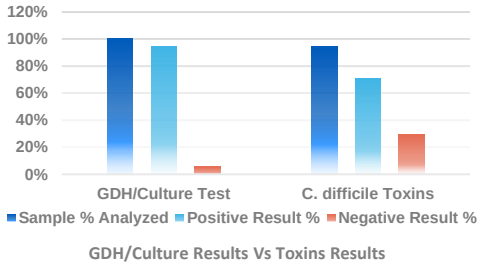
a) 100% of toxin-positive patients were given 10 days oral vancomycin.
b) 100% of toxin-positive patients had no missed doses.

Audit Methodology

Data on Meditech Electronic Medical Records (MEMR) from 04/2020 to 10/2020 was screened retrospectively in 11/2020, to identify patients who received vancomycin for *C. difficile*. This audit was approved by the department Research & Audit group.

Audit Results

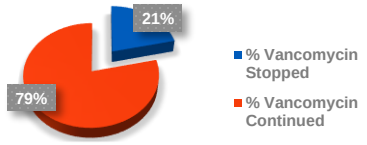
All 54 *C. difficile* suspected patients had either GDH or culture test (100%).



GDH/Culture Results Vs Toxins Results

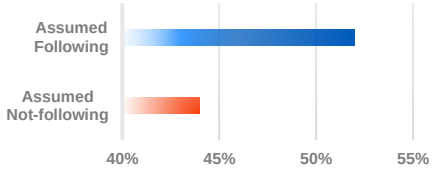
Forty-eight out of 51 positive GDH/culture patients had faecal toxin test (94.4%). Fourteen out of 48 faecal toxin tests were negative (29.2%), while the remaining 34 tests were positive.

Although the guideline states that vancomycin therapy is stopped after receiving negative faecal toxins, it was stopped only in three patients (21%).



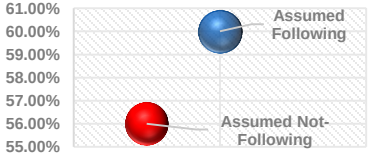
What Happened After Receiving Negative Toxins Result

Vancomycin was prescribed and administered for 10 days in 15 toxin-positive patients (44%).
The remaining patients followed other durations.



Correct Vancomycin Duration, Including Missed Data Assumption

Nineteen toxin-positive patients (56%) had no missed vancomycin doses.



No Missed Doses %, Including Missed Data Assumption

Missing vancomycin reasons was identified as a secondary outcome during data collection. The most common reasons were absence of vancomycin at administration time and patient refusal.

Audit Results Insights

57.5% of cases followed the trust guideline. This was limited by absence of some patients' data, which impacted some parameters by up to 10% as shown in the previous graphs.

The concluded recommendations of the audit are:

I. For Improving Vancomycin Prescribing

1. Renaming & Explaining CDI tests on MEMR.
2. Automatic faecal toxin testing if either GDH test or culture test result is positive.
3. Updating the trust guideline to allow 10 to 14 days of vancomycin [7].
4. Updating STSFT *C. difficile* guideline to allow GDH/culture-positive but faecal toxin-negative patients access to vancomycin, in liaison with microbiology teams, if other diagnoses except *C. difficile* infection are exhausted [8].

II. For Improving Vancomycin Administration

1. Stocking oral vancomycin on high risk wards.
2. Auditing patients' refusal of vancomycin therapy.

Audit Effect On Practice

The recommendations are currently under review by STSFT to consider local practice changes, which would improve the management of CDI.

References

1. Clostridium difficile [Internet]. nhs.uk. 2018 [cited 15 December 2020]. Available from: https://www.nhs.uk/conditions/c-difficile
2. South Tyneside & Sunderland Combined Guidelines / Treatment / Gastrointestinal / Clostridium difficile infection (adults) [Internet]. Viewer.rx-guidelines.com. 2020 [cited 15 December 2020]. Available from: https://viewer.rx-guidelines.com/STSFT/Abx#content.5gD6Z9wUGP
3. Northern Devon Healthcare NHS Trust Infection Prevention & Control Annual Repot 2016-17.Page 4, 2017.
4. H. Matsuura and H. Jinno, Mitoyo General Hospital, Kanonji, Kagawa 769-1695, Japan, 2017.
5. As advertised on Savyon Diagnostics website: CoproStrip™ C. difficile GDH + Toxin A + Toxin B rapid test - Savyon Diagnostics
6. As advertised on bioMérieux website: bioMérieux - Culture Media | product - CHROMID® C. difficile (biomerieux-culturemedia.com)
7. Nice.org.uk. 2020. Summary Of Antimicrobial Prescribing Guidance – Managing Common Infections. [online] Available at:https://www.nice.org.uk/Media/Default/About/what-we-do/NICE_guidance/antimicrobial%20guidance/summary-antimicrobial-prescribing-guidance.pdf [Accessed 30 December 2020].
8. Clostridium Difficile Testing Recommendations: Clostridium difficile Toolkit for Long-term Care Facilities - Minnesota Dept. of Health [Internet]. Health.state.mn.us. [cited 15 December 2020]. Available from: https://www.health.state.mn.us/diseases/cdiff/hcp/ltctoolkit/testing.html

The path to excellence