Utilization of Stepwise Initial Therapy Evaluation by AST Pharmacists for Appropriate Vancomycin Use

RES-208

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University of Miyazaki Hospital

Location: Kiyotake, Miyazaki City, JAPAN
Number of beds: 604
Number of staff: 1,472 (as of April 1, 2024)
Average number of inpatients: 488.6 per day (2024)
Average number of outpatients: 1,095.9 per day (2024)
Average length of hospital stay: 12.6 days (2024)
Bed occupancy rate: 80.9% (2024)
Facility standard: Infection Control Enhancement Fee I

Center for Infection Control (CIC)

Physicians: 3
Nurses: 2
Pharmacists: 2
* (including 1 full-time AST member)
Clinical Microbiology Technologist : 1
Clerical staff: 1

Background

Our hospital has promoted antimicrobial stewardship (AS) by revising antibiotic notification forms and conducting in-hospital conferences. To further improve AS and standardize vancomycin use, a stepwise assessment by antimicrobial stewardship team (AST) pharmacists was introduced at the start of therapy.

Objective

This study aimed to clarify appropriate indications for vancomycin use and enhance collaboration between pharmacists and physicians through initial evaluation.

Methods

From January to December 2024, 311 patients administered vancomycin were classified using a **five-step assessment**. Evaluations from January to June (pre-intervention) were retrospective; those from July to December (post-intervention) were prospective.
Process indicators such as **days of therapy**, **rate of culture specimen submission**, **therapeutic drug monitoring**, and **duration of antimicrobial administration** were compared.
Among the categories in the table on the right, **Ⅰ and Ⅱ were judged as appropriate use**, while **Ⅲ to Ⅴ were judged as inappropriate use**.

Stepwise Initial Therapy Evaluation for Vancomycin

Ⅰ agreement with use
- Infection with Gram-positive bacteria resistant to β-lactams (e.g., MRSA, MRSE)
- Severe infections requiring MRSA coverage, such as septic shock
- History of MRSA detection, indicating need for coverage
- Suspected infection caused by Gram-positive bacteria (e.g., *Enterococcus faecium*)
- Judged more severe than indicated by SOFA score

Ⅱ agreement with agent but dose adjustment needed
Ⅲ need to confirm necessity of MRSA coverage
Ⅳ pathogen already identified
Ⅴ no cultures or unclear indication

1) Open Forum Infect Dis 2018 22;5(12):314.

Results & Discussion

① : five-step assessment

five-step assessment	Pre-intervention		Post-intervention	
	Cases	%	Cases	%
Ⅰ. agreement with use	120	79.5	127	79.4
Ⅱ. agreement with agent but dose adjustment needed	8	5.3	10	6.3
Ⅲ. need to confirm necessity of MRSA coverage	22	14.6	20	12.5
Ⅳ. pathogen already identified	1	0.7	3	1.9
Ⅴ. no cultures or unclear indication	0	0	0	0

➢ The five-step evaluation distribution remained unchanged pre- and post-intervention.

② : Comparison of process indicators before and after the intervention

	Pre-intervention	Post-intervention
Number of patients administered	151	160
Rate of therapeutic drug monitoring (%)	98.5	96.2
Rate of culture submission (%)	99.3	98.8
DOT (100bd)	1.48	1.40
duration of antimicrobial administration (days)	8.68	8.67

➢ Process indicators remained unchanged pre- and post-intervention.

③ : Five-step evaluation and duration of administration

duration of administration

	Cases	≦7 days	8–14 days	≧15 days
Pre-intervention	151	57.6%	29.1%	13.2%
Post-intervention	160	60.6%	21.3%	18.1%

Appropriate use Ⅰ, Ⅱ (Post-intervention)

duration	Cases (n=137)	%
≦7 days	77	56.2
8–14 days	34	24.8
≧15 days	26	33.8

In-appropriate use Ⅲ～Ⅴ (Post-intervention)

duration	Cases (n=23)	%
≦7 days	20	87.0
8–14 days	0	0
≧15 days	3	13.0

➢ Among the cases judged as inappropriate, 87% were completed within 7 days, allowing early collaboration with the relevant departments for cases where vancomycin use was unnecessary or the causative pathogen had been identified.

④ : Infection at the start of therapy after the intervention

Infection	Appropriate use Ⅰ, Ⅱ (N=137)	Inappropriate use Ⅲ～Ⅴ (N=23)
Bloodstream infection	39	4
Respiratory infection	36	**13**
Urinary tract infection	4	0
Skin and soft tissue infection	11	3
Central nervous system infection	7	0
Gastrointestinal infection	3	0
Bone and joint infection	5	0
Surgical site infection	5	0
Febrile neutropenia	10	2
Others	17	1

➢ Most of the cases judged as inappropriate were respiratory infections, and they were concentrated in certain departments. Going forward, appropriate use of anti-MRSA agents for respiratory infections in the target departments remains a challenge.

⑤ : 13 cases of respiratory infections judged as inappropriate

NO.	Resp. infections	Sputum culture smear	GECKLER	qSOFA	Isolated pathogen
1	CAP	polymicrobial	1	2	Commensals
2	VAP	GNR	5	SOFA6	*P .aeruginosa*
3	HAP	polymicrobial	3	1	*K. variicola*、MSSA
4	HAP	polymicrobial	2	2	Commensals
5	CAP	none	6	1	Not detected
6	HAP	polymicrobial	3	0	MSSA
7	HAP	polymicrobial	3	1	*K. oxytoca*、*E. coli*、MSSA
8	HAP	polymicrobial	3	1	*K. aerogeness*、MSSA、*S. maltophilia*
9	HAP	polymicrobial	5	0	*E. cloacae complex*、Commensals
10	CAP	polymicrobial	1	1	Commensals
11	HAP	GPC	4	1	MSSA
12	HAP	GPC、GNR	6	1	*P. aeruginosa*
13	HAP	polymicrobial	3	1	Commensals

*CAP:Community-Acquired Pneumonia / HAP:Hospital-Acquired Pneumonia / VAP:Ventilator-Associated Pneumonia

Conclusion

1. Support for standardized evaluation
- The structured, objective assessment enabled standardized evaluation of vancomycin use.

2. Enhanced pharmacist–physician collaboration
- The structured assessment facilitated prioritization of issues requiring collaboration and improved communication.

3. Contribution to antimicrobial stewardship activities
- Stepwise evaluation may serve as an effective tool for advancing AS activities by identifying targets for intervention.

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