

Antibiotic (ABX) De-escalation in Sepsis: A Retrospective Study in a Tertiary Care Medical Center with an Established Antimicrobial Stewardship Program (ASP)

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ABSTRACT

Background: De-escalation of prompt, broad spectrum empiric ABX therapy is recommended in the therapy of sepsis. The frequency of this de-escalation is not well described. The aim of this study is to determine the frequency and characteristics of ABX de-escalation in patients with sepsis at an 885-bed tertiary care medical center with an established ASP.

Methods: Adult inpatients with sepsis or septic shock during 2011 were randomly selected. Records (n=180) were retrospectively reviewed for demographics; ABX regimen, duration and adequacy; reason for de-escalating or continuing ABX; culture results; in-house mortality; length-of-stay (LOS) and 30-day re-admission. Adequacy was defined as empiric ABX susceptibility of all cultured pathogens, and de-escalation as ABX discontinuation or narrow spectrum substitution. The proportion of patients de-escalated by 72 and 96 hrs was calculated. An adjusted de-escalation proportion was determined by subtracting from the total population patients who died prior to 96 hrs, or could not be de-escalated due to culture susceptibility results.

Results: ABX were de-escalated in 43 (24%) and 87 (48%) patients by 72 and 96 hrs, respectively (Table). The adjusted 96 hour ABX de-escalation proportion was 66%. Cultures were obtained in 178 (99%) patients. The proportion of patients de-escalated was not significantly different for those with positive or negative cultures. The ABX de-escalation group had a shorter LOS and less in-hospital mortality. Reasons for not de-escalating were persistence of SIRS/fever (30), microbial susceptibility only to empiric therapy (18), and negative culture results (13).

Selected Characteristics of 96 hour De-escalation			
	De-escalation (n=87)	No De-escalation (n=93)	p-value
	No. (%)	No. (%)	
Culture positive	60 (69)	59 (63)	0.53
Adequate empiric ABX	56 (93)*	42 (71)*	0.003
Mortality	6 (7)	44 (47)	<0.001
Mortality after 96 hrs	6 (7)	23 (32)	<0.001
Mean LOS	13	21	0.01
30-day re-admission	4 (5)	6 (6)	0.75

Conclusion: A modest number of patients in whom ABX were empirically started for sepsis were de-escalated by 96 hours (half between 72 and 96 hrs). Culture positivity did not appear to affect de-escalation decisions. Further data is needed to determine optimal de-escalation metrics for patients with sepsis.

BACKGROUND

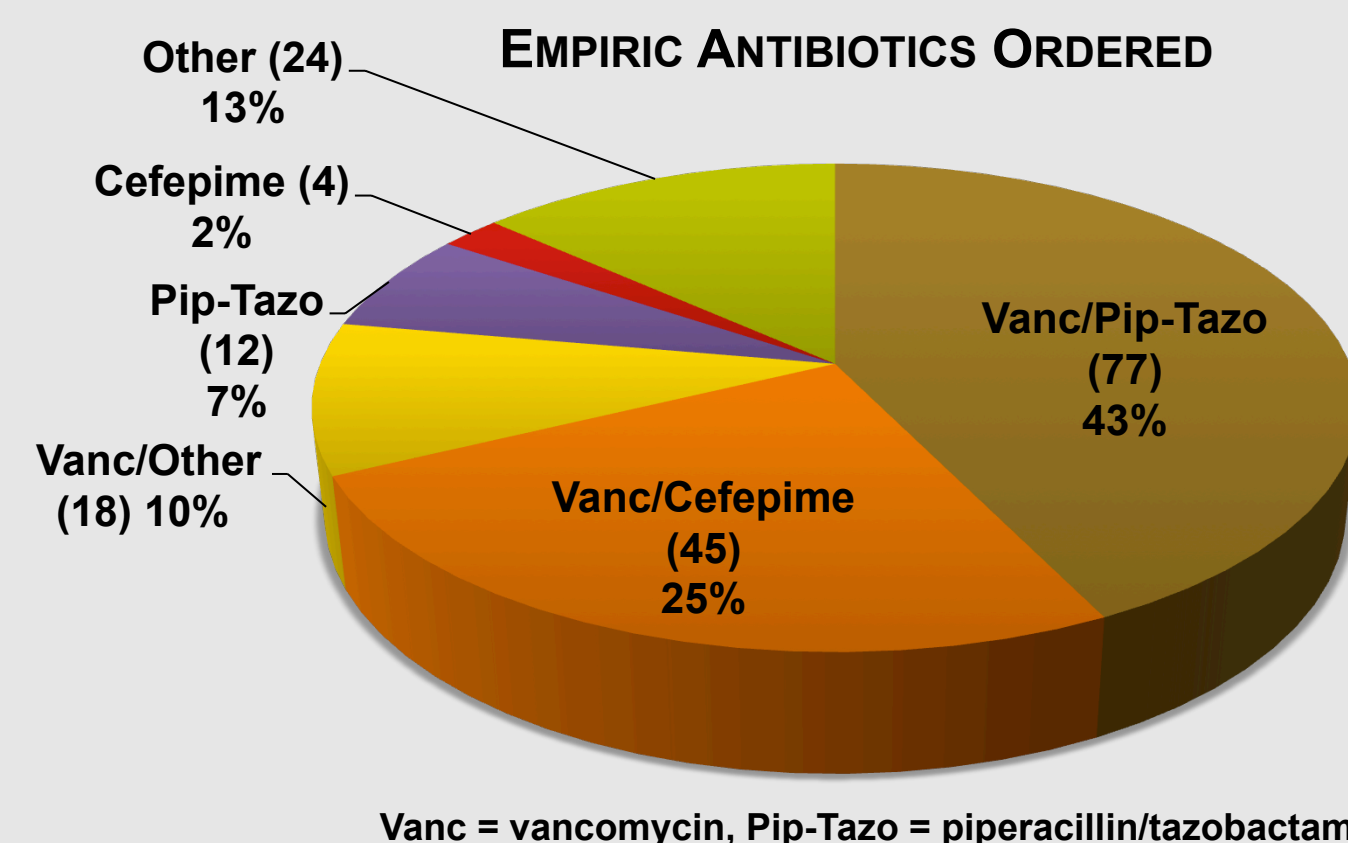
- Current sepsis guidelines recommend early broad-spectrum empiric antibiotic therapy and de-escalation.¹ The frequency with which de-escalation occurs, and standard metrics for de-escalation are not well described.²
- Studies on de-escalation in sepsis have been focused on VAP.³ A few studies outside the US have described rates for sepsis in the ICU setting.^{4,5}
- The aim of this study is to determine the frequency and characteristics of antibiotic de-escalation in patients with sepsis at an 885-bed tertiary care medical center with an established antibiotic stewardship program (ASP).

METHODS

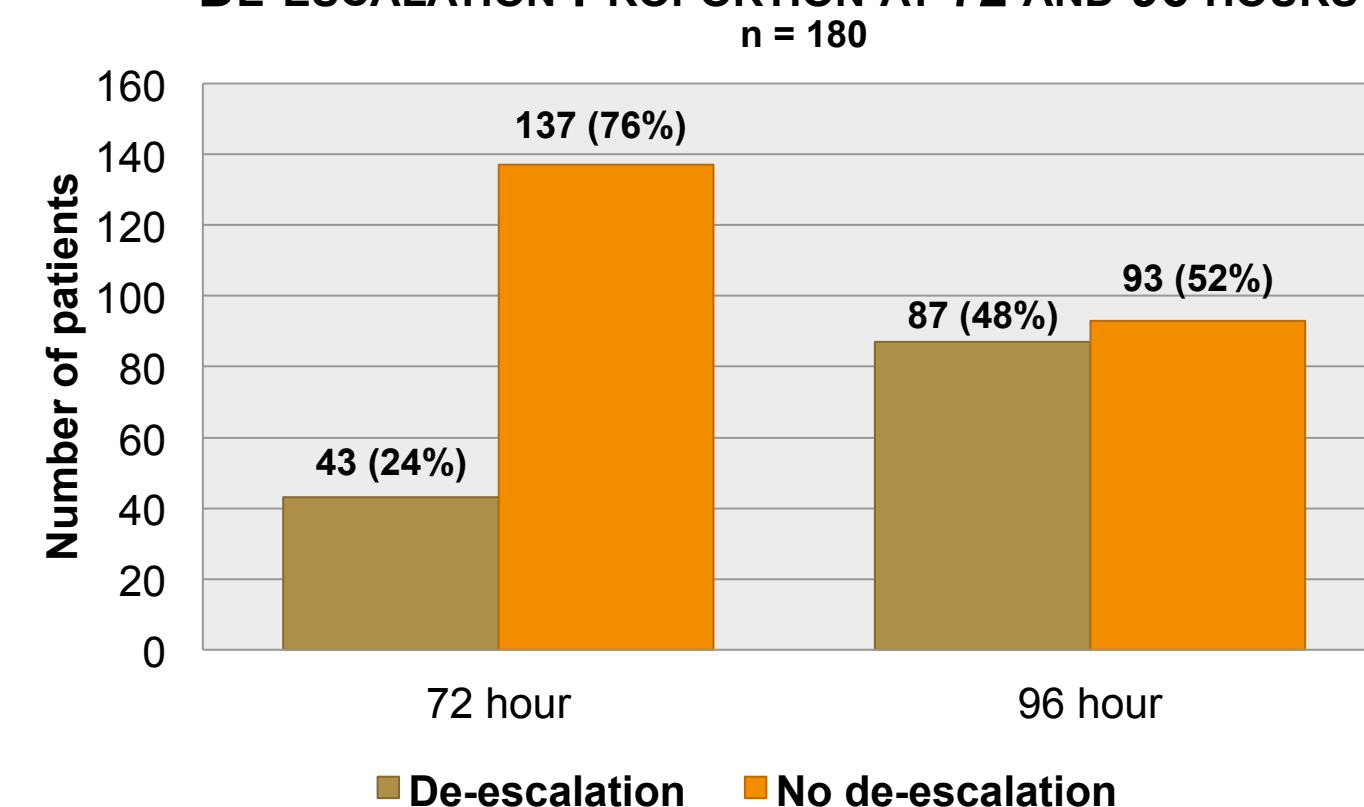
- Setting:** 885-bed tertiary care medical center with an established antibiotic stewardship program (ASP)
- Study patients** were randomly selected from a database of 1644 adult patients who were admitted from January to December 2011 and had a discharge diagnosis of sepsis or septic shock.
- Records (n=180)** were retrospectively reviewed for demographics; ABX regimen, duration and adequacy; reason for de-escalating or continuing ABX; culture results; in-house mortality; length-of-stay (LOS) and 30-day re-admission.
- Adequacy** was defined as in vitro antibiotic susceptibility of all cultured pathogens, and de-escalation as antibiotic discontinuation or narrow spectrum substitution.
- The proportion of patients de-escalated by 72 and 96 hrs was calculated.
- An adjusted de-escalation proportion was determined by subtracting from the total population patients who died prior to 96 hours, or who could not be de-escalated due to culture susceptibility results.

RESULTS

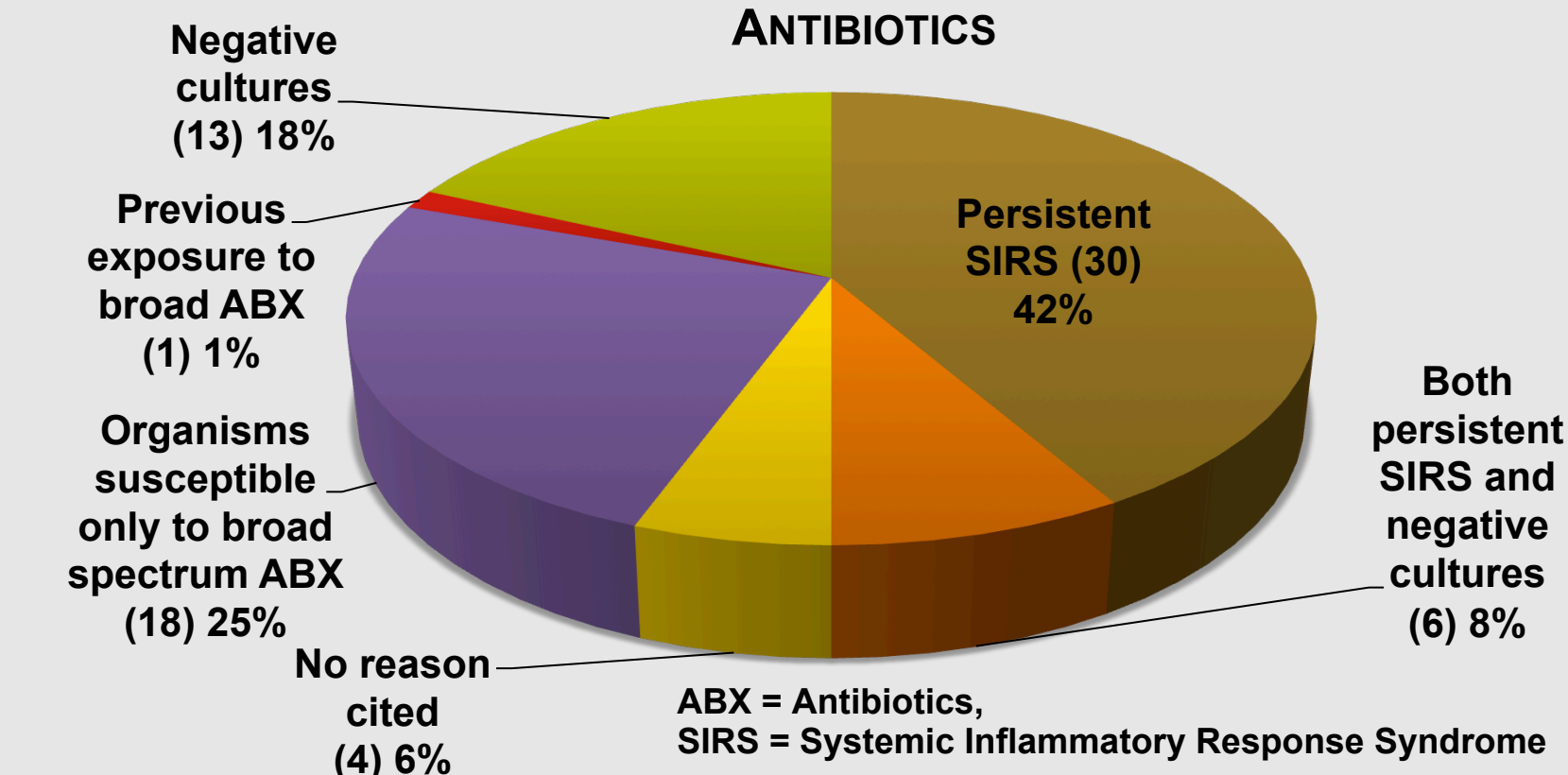
- The study population had a mean age of 61 (Range 19-90). Fifty three percent (96/180) were women. Sixty percent (108/180) had a discharge diagnosis of sepsis, and 40% (72/180) of septic shock.
- The majority of study patients were admitted to the MICU (58/180) 32%, followed by the Hospitalist Medicine service (29/180) 16%, and Oncology (23/180) 13%.



DE-ESCALATION PROPORTION AT 72 AND 96 HOURS



REASONS CITED FOR CONTINUING ON EMPIRIC ANTIBIOTICS



DISCUSSION

- The 96 hour antibiotic de-escalation proportion was 48%. The adjusted 96 hour antibiotic de-escalation proportion was 66%.
- Cultures were obtained in 178 (99%) patients. The proportion of patients de-escalated was not significantly different for those with positive 50% (60/119) or negative 44% (27/61) cultures (P=0.53).
- De-escalation was more frequent in patients with sepsis 56% (60/108) vs septic shock 38% (27/72) P=0.02.

Selected Characteristics of 96 hour De-escalation			
	De-escalation (n=87) (%)	No De-escalation (n=93) (%)	p-value
Culture positive	60 (69)	59 (63)	0.53
Adequate empiric antibiotics	56 (93)*	42 (71)*	0.003
Septic shock	27 (31)	45 (48)	0.02
Mortality	6 (7)	44 (47)	<0.001
Mortality after 96 hrs	6 (7)	23 (32)	<0.001
Mean LOS	13	21	0.01
30-day re-admission	4 (5)	6 (6)	0.75

* Adequacy of empiric ABX could be assessed for 60 patients in the de-escalation group and in 58 in the no de-escalation group

CONCLUSION

- A modest number of patients in whom antibiotics were empirically started for sepsis were de-escalated by 96 hours (half between 72 and 96 hrs).
- Culture positivity did not appear to affect the frequency of de-escalation.
- Further data is needed to determine optimal de-escalation metrics for patients with sepsis.

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