

Effect of Piperacillin/tazobactam Restriction on Prescribing Habits and Rates of Acute Renal Failure

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BACKGROUND

Piperacillin/tazobactam (PT) was found to be a frequent empiric antibiotic choice and possibly associated with an elevated risk of acute renal failure (ARF) at the VA St. Louis Health Care System. On 15 July 2012, PT was restricted, requiring clinical pharmacy or infectious diseases approval for durations exceeding 72 hours.

METHODS

A retrospective cohort was undertaken to determine if this restriction decreased PT usage and/or rates of ARF (defined as a 50% increase or 0.5 mg/dL increase in serum creatinine from baseline). Patients prescribed at least 1 day of PT with a creatinine clearance (CrCl) >39 mL/min at the time of initiation in the 3 months prior to the restriction (15 April – 30 June 2012) were compared to patients receiving at least 1 day of PT with a CrCl >39 mL/min in the 5 months after restriction implementation (1 August – 31 December 2012).

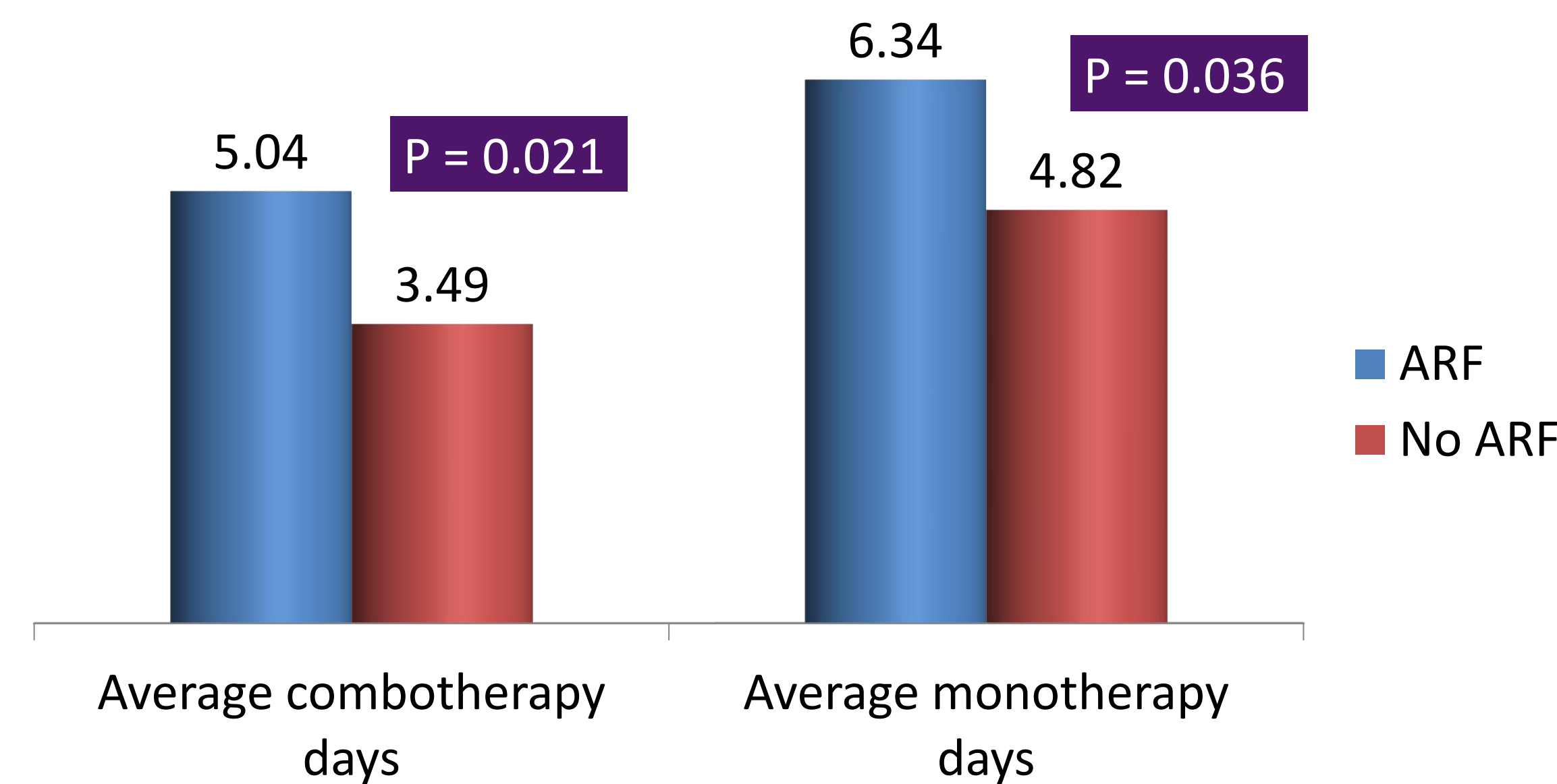
The number of days of PT therapy in the pre-implementation (PRI) and post-implementation (POI) groups, along with rates of ARF, were compared.

Key Study Definitions

Acute Renal Failure (ARF)	Increase in SCr by 0.5 mg/dL or an increase from baseline by 50%
Combination therapy	Patients who received vancomycin plus piperacillin/tazobactam
Monotherapy	Patients who received piperacillin/tazobactam without vancomycin

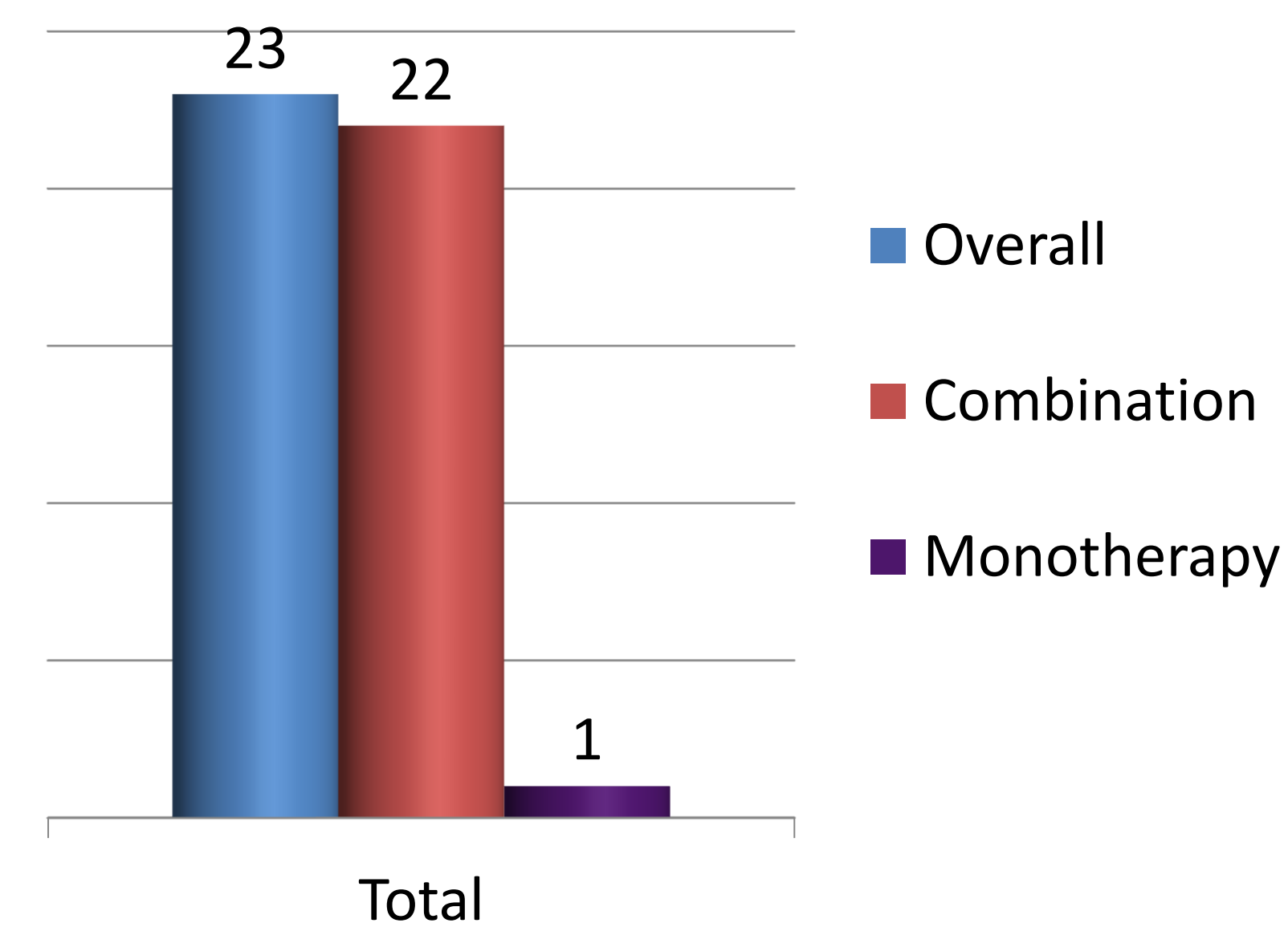
Patient Characteristics	Pre-implementation (n=120)	Post-implementation (n=122)	P value
Mean Age (years)	64.8	63.5	0.354
Mean Duration of PT Therapy (days)	5.22	4.71	0.224
Mean Duration of Combination Therapy (days)	4.00	3.27	0.105
Episodes of Acute Renal Failure (n)	12	11	0.039
Serum Creatinine at Initiation (mg/dL)	1.05	0.99	0.116

Days of Antibiotic Therapy Between ARF and No ARF



Patient Characteristics	ARF (n=23)	No ARF (n=219)	P value
Mean Age (years)	60.9	64.5	0.053
Mean Duration of PT Therapy (days)	6.34	4.82	0.036
Mean Duration of Combination Therapy (days)	5.04	3.49	0.021
Serum Creatinine at Initiation (mg/dL)	1.05	1.02	0.638
Monotherapy (n)	1	55	< 0.001

Patients Developing ARF on Therapy



RESULTS

One-hundred fifteen unique patients were included in the PRI group and compared to 117 unique patients in the POI group. The PRI group received an average of 5.22 days of PT, compared to 4.71 days in the POI ($P=0.224$).

Ten percent (12/120) of courses in the PRI group led to ARF compared to 9.01% (11/122) of courses in the POI group ($P=0.0309$). Potential confounders for renal function were evaluated at baseline (use of loop diuretics, angiotensin converting enzyme inhibitor therapy, co-administration of aminoglycosides, and contrast administration during hospitalization) and were not significantly different between groups. Ninety five patients in the PRI group and 91 in the POI received combination therapy with vancomycin. ARF occurred in 11.6% (11/95) of those in the PRI group and 12.1% (11/91) in the POI ($P>0.05$).

Overall, 11.8% (22/186) of courses with PT and vancomycin developed ARF, compared to 1.7% (1/56) of courses with PT monotherapy ($P<0.0001$).

CONCLUSIONS

This restriction resulted in a numeric reduction in the number of PT days in the post-implementation group, and a significant reduction in the rate of ARF. In addition, combination therapy with vancomycin and PT significantly increased risk of ARF compared to PT monotherapy.