Antibiotic monotherapy with possible stopping at 3 days benefited low-risk ICU patients with pulmonary infiltrates

QUESTION

In patients in the intensive care unit (ICU) who develop pulmonary infiltrates and have a low risk for pneumonia, is antibiotic monotherapy with possible stopping after 3 days as efficacious as standard physician-directed antibiotics?

DESIGN

Randomized (unclear allocation concealment*), unblinded,* controlled trial with 30-day follow-up.

SETTING

Surgical and medical ICUs of a tertiary-care Veteran Affairs hospital in Pittsburgh, Pennsylvania, United States.

PATIENTS

81 consecutive adults (mean age 67 y, 58% ventilated) who developed pulmonary infiltrates and had a low risk for pneumonia defined by a clinical pulmonary infection score (CIPS) ≤ 6: temperature $\geq 38.5°$ C to $\leq 38.9°$ C (1 point) or either $\geq 39°$ C or $\leq 36°$ C (2 points); blood leukocytes < 4000 or > 11 000^3 (1 point with 1 additional point for band formation $\geq 50\%$); nonpurulent (1 point) or purulent (2 points) tracheal secretions; hypoxia ($Pa_{O_2}/Fi_{O_2} \leq 240$) and no adult respiratory distress syndrome (2 points); pulmonary radiograph with diffuse (1 point) or localized (2 points) infiltrate; radiographic progression of infiltrates (2 points); and culture of pathogenic bacteria of at least moderate quantity (1 point with 1 additional point for positive Gram stain). Exclusion criteria included HIV infection, neutropenia, and recent prophylactic antibiotics. Follow-up was 100%.

INTERVENTION

39 patients were allocated to intravenous ciprofloxacin, 400 mg every 8 hours for 3 days. At 3 days, patients were evaluated: If the CPIS was ≤ 6, ciprofloxacin was stopped; if it was > 6, ciprofloxacin was continued or another antibiotic was started. 42 patients were allocated to physician-directed antibiotics (control group).

MAIN OUTCOME MEASURES

Mortality, length of ICU stay, emergence of antimicrobial resistance or superinfection, and direct costs of antibiotics.

MAIN RESULTS

The study was stopped early because of changes in antibiotic prescribing behavior. The groups did not differ for mortality ($P = 0.06$) (Table). Patients in the ciprofloxacin group had shorter ICU stays (mean 9.4 vs 14.7 d, $P = 0.04$; 1 patient in the control group spent 91 d in the ICU); fewer days on antibiotics (mean 3 vs 9.8 d, $P < 0.001$); lower incidence of antimicrobial resistance or superinfections ($P = 0.02$) (Table); and lower mean antibiotic costs (U.S. $235 vs $640/person, $P < 0.001$).

CONCLUSION

ICU patients at low risk for pneumonia who developed pulmonary infiltrates and who were given antibiotic monotherapy with possible stopping after 3 days had lower rates of use, cost, length of stay, resistance, and superinfection than did patients who received physician-directed antibiotic treatment.

*See Glossary.

Ciprofloxacin with possible stopping after 3 days vs physician-directed antibiotics for ICU patients at low risk for pneumonia who developed pulmonary infiltrates†

Outcomes at 30 d	Ciprofloxacin	Control	RRR (95% CI)	NNT (CI)
Mortality	13%	31%	59% (0.1 to 84)	Not significant
Resistance or superinfection	14%	38%	64% (16 to 86)	5 (3 to 22)

†Abbreviations defined in Glossary; RRR, NNT, and CI calculated from data in article.

COMMENTARY

ICU patients who develop a new pulmonary infiltrate present a vexing clinical dilemma (1). Does the infiltrate represent a new infection, or is it caused by such noninfective disorders as pulmonary embolism, congestive heart failure, or pulmonary hemorrhage? Is the risk of treatment of this infiltrate with antibiotics and the potential emergence of bacterial resistance overshadowed by the concern of possible death because of untreated infection? Singh and colleagues have suggested a rational approach to managing the ICU patient with new pulmonary infiltrates. They critically evaluated continued antibiotic use at 72 hours by stratifying for the probability and severity of pneumonia using the CPIS criteria (2). These criteria identify patients (CPIS ≤ 6) who may not require further antibiotic treatment at 72 hours, provided that other sources of infection are considered. The benefits of stopping antibiotics at 72 hours in patients with a CPIS ≤ 6 were unopposed by any apparent increase in mortality; in fact, a nonsignificant trend toward increased mortality was found in the control group.

The routine use of empiric broad-spectrum antibiotics in ICU patients with new pulmonary infiltrates must be critically questioned. The study showed that antibiotic overuse could cause measurable harm in this patient setting. Antibiotic monotherapy that is discontinued after 3 days in patients with a pulmonary infiltrate and a CPIS ≤ 6 appears to be a valid clinical strategy. Use of the CPIS criteria provides physicians with a quantitative aid to make tough clinical decisions for ICU patients with new pulmonary infiltrates.

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References

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