

Rapid molecular diagnostic tests in patients with bacteremia: evaluation of their impact on decision making and clinical outcomes

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OBJECTIVE

We performed a systematic review and meta-analysis of the data regarding rapid diagnostic tests and their advantages or limitations on patients' clinical outcomes.

METHODS

➤PubMed and Scopus databases were searched and relevant data were extracted independently by two investigators (FIA and KKT), up to August 2014.

➤Additional hand searches of reference lists and relevant articles were performed.

➤No restrictions on written language or year of publication were set.

➤Studies comparing conventional methods (cultures) to rapid tests were evaluable for inclusion when new tests were part of the diagnostic algorithm and treatment decisions were based on them.

➤Additionally, studies that reported clinical outcomes when conventional methods and rapid tests were performed in all participants were also considered eligible.

➤Studies on bacterial infections other than sepsis, as well as on viral infections, tuberculosis, fungal infections and parasitic infections were excluded.

➤Rapid tests could be applied on positive blood culture (BC) or directly on blood samples.

➤Studies that exclusively included data regarding time to identification, sensitivity, specificity or predictive values of a method, as well as concordance between compared methods were eliminated.

➤Blood stream infection (BSI) was defined as at least one positive BC with or without other signs or symptoms of infection.

➤Sepsis was defined according to clinical signs and symptoms or specific criteria as determined by investigators of each study.

➤The primary outcome was all cause mortality (in-hospital, intensive care unit (ICU) or at any time point), as well as predictors of mortality, with regard to the administered diagnostic method.

➤Hospital length of stay (LOS), ICU LOS and impact on therapeutic decisions were the secondary outcomes.

RESULTS

➤Twenty five articles were selected;

➤17 articles reported data for mortality or predictors of mortality

➤Comparative mortality data was available in 8 studies.

➤Only those that compared rapid tests in conjunction with antimicrobial stewardship programs (ASP) showed a mortality benefit (figure 1).

➤Three showed a non-significant decrease from 3% to 8%, while 3 others showed a significant decrease ranging from 7.6% to 12.1%. Two studies showed an increase in mortality (5% and 24.1%, figure 2).

➤Data also suggested that the persistence of high bacterial levels in patients' blood, measured by polymerase chain reaction, may predict a poor clinical outcome.

➤14 articles reported data for hospital or ICU LOS

➤A reduction in hospital or intensive care unit length of stay was observed in almost all studies when the rapid tests, with or without ASP, were used.

➤15 articles reported data for therapeutic decisions.

➤Treatment decisions were taken earlier in the rapid test groups.

Figure 1. Mortality according to the implementation of ASP.

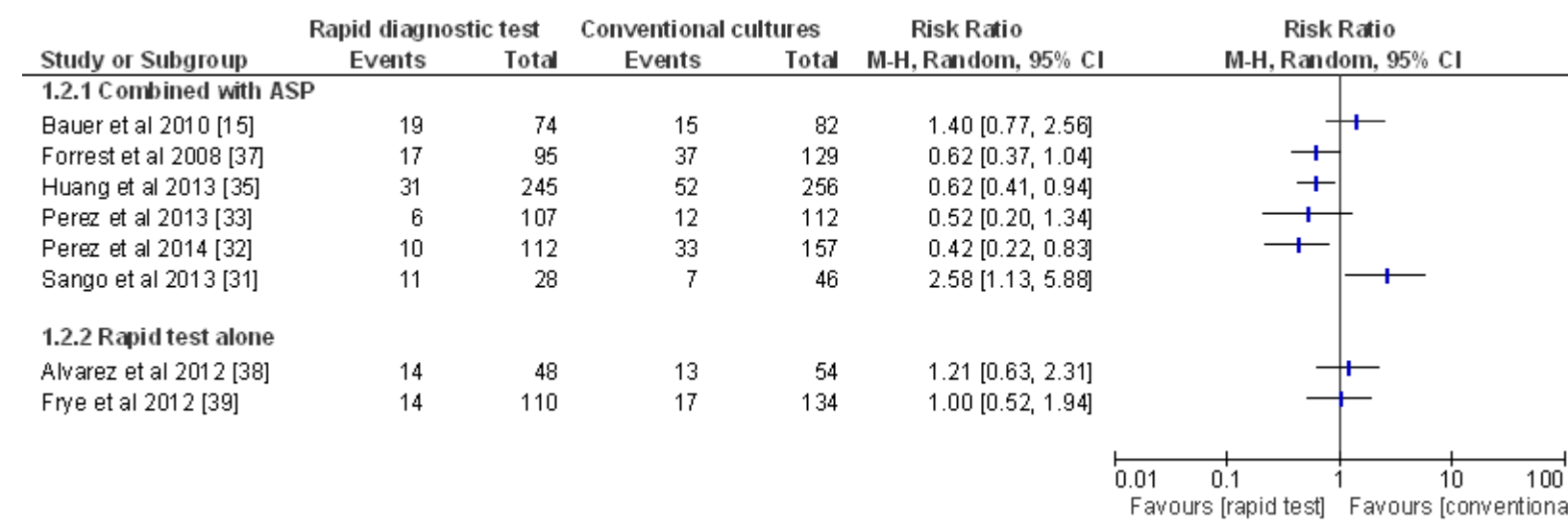
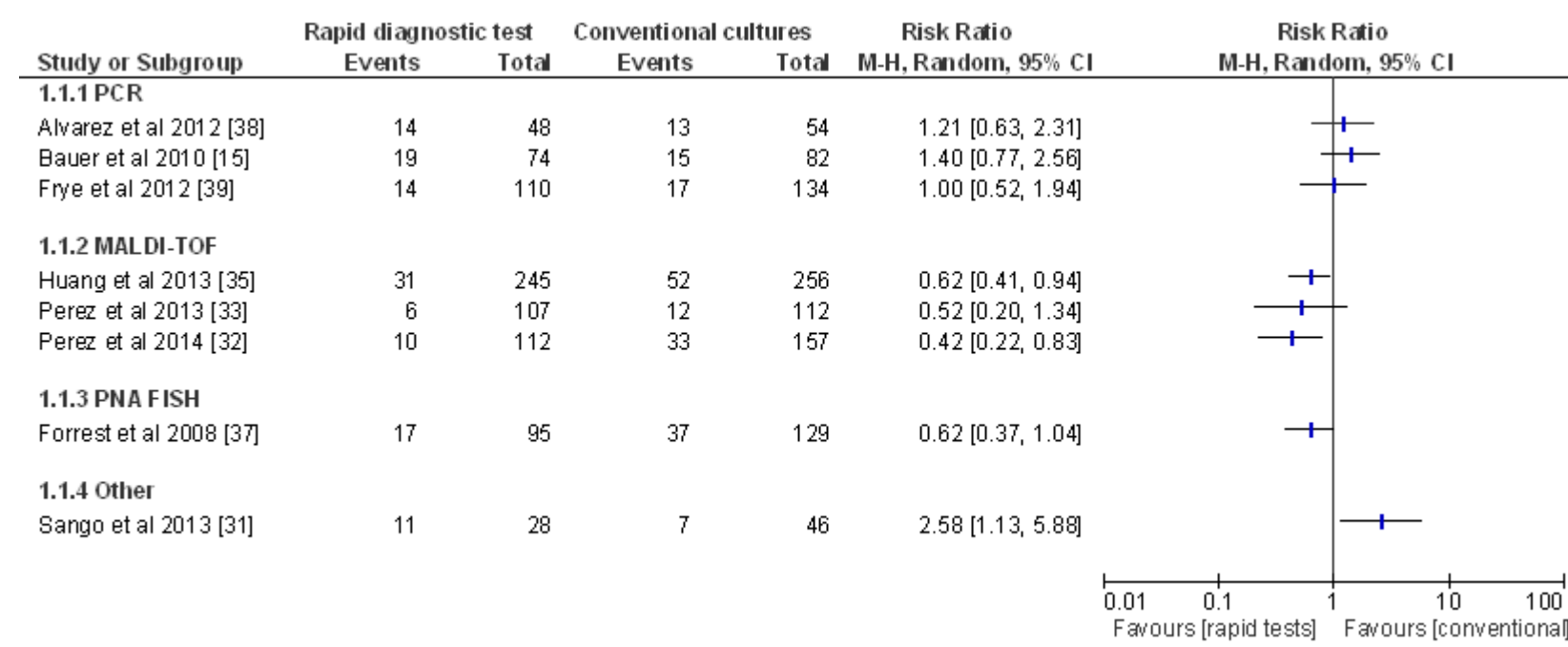


Figure 2. Mortality according to the testing method employed in studies.



DISCUSSION

➤Regarding mortality, the reported differences varied among studies without an obvious trend in favor of rapid tests.

➤The differences in mortality observed in several articles cannot be attributed with certainty to the contribution of rapid techniques alone, since most of those that showed a mortality difference used an ASP in conjunction with the rapid methods.

➤Furthermore, few of them provided data regarding the effect of possible confounding factors on mortality.

CONCLUSIONS

In conclusion, the currently available data regarding rapid molecular tests is heterogeneous and in the absence of clear benefit on patients' outcomes can only support their complementary use to blood cultures in daily practice. It is crucial to differentiate the ASP influence from that of rapid tests and clarify the actual effect of each factor separately. In this direction, future studies of higher quality should compare the combination of ASP and rapid tests to the combination of the same ASP and BC.