BIOSITE
NEW DIMENSIONS IN DIAGNOSIS®
Case Study

Rapid BNP Improves Patient Care While Reducing Cost and Length of Stay in Patients With Shortness of Breath

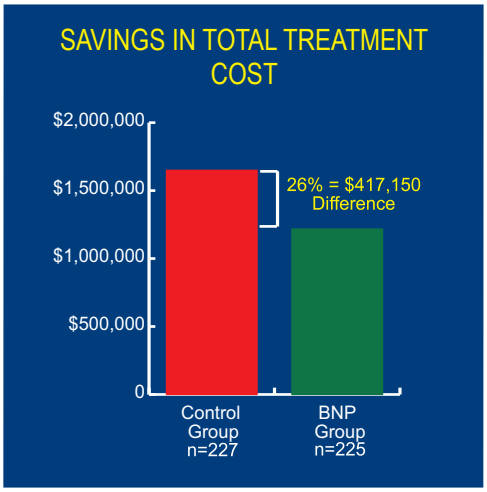
Christian Mueller, M.D., André Scholer, Ph.D., Kirsten Laule-Kilian, B.Sc., Benedict Martina, M.D., Christian Schindler, Ph.D., Peter Buser, M.D., Matthias Pfisterer, M.D., André P. Perruchoud, M.D., affiliated with the University Hospital in Basel, Switzerland

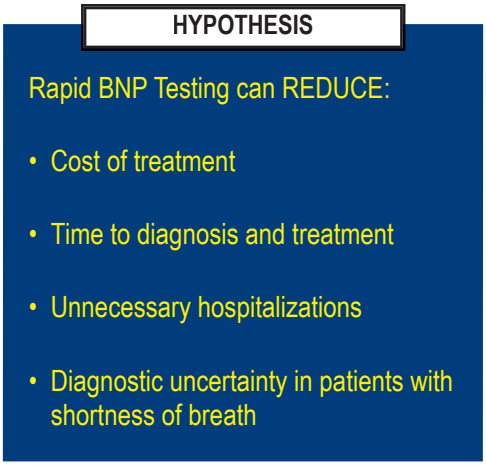
EXECUTIVE SUMMARY

The February 2004 edition of The New England Journal of Medicine published a diagnostic study evaluating the use of Biosite's rapid Triage® B-type Natriuretic Peptide (BNP) Test in emergency department patients presenting with shortness of breath (dyspnea). The study found that when used in conjunction with other clinical information, rapid BNP testing resulted in:

- Reduced overall cost of treatment by $417,150 or 26%. Extrapolating this to the entire study cohort would have meant a total cost savings of approximately $838,000
- Reduced time to treatment by approximately 30 minutes
- Lowered hospital admission rates by 10 percentage points
- Reduced ICU admission rates by 9 percentage points
- Reduced length of stay by 3 days

"The availability of a rapid BNP test in 15 minutes can improve clinicians' ability to provide early, accurate diagnosis and treatment, resulting in better outcomes for heart failure patients and overall economic impact for the hospital."
— Dr. Christian Mueller, Cardiologist, University Hospital, Basel, Switzerland



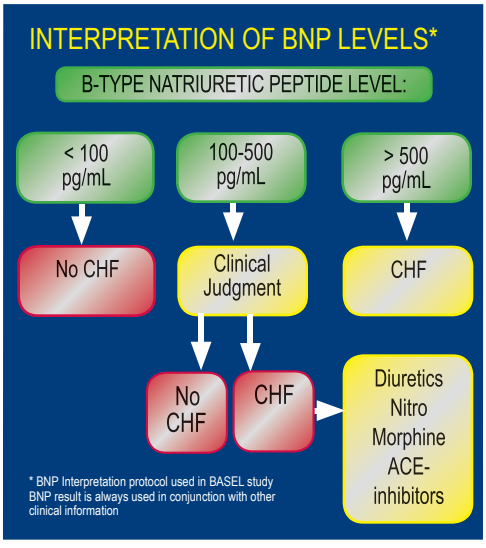


SITUATION: CHALLENGE OF DIFFERENTIAL DIAGNOSIS OF HEART FAILURE

Emergency department (ED) physicians must frequently determine whether acute dyspnea is due to congestive heart failure (CHF) or pulmonary disease such as pneumonia. Correct diagnosis is critical because treatment for each condition is different. If a patient's symptoms, history, ECG and X-ray data are inconclusive, the initial diagnosis may be incorrect and appropriate treatment may be delayed. Misdiagnosis of either CHF or pulmonary disease and subsequent incorrect therapy may even worsen the actual medical condition as well as increase the time and cost of treatment. A test that reduces the diagnostic uncertainty in such cases would benefit patients, clinicians, and health care administrators.

OBJECTIVE: TO EVALUATE THE CLINICAL AND FINANCIAL BENEFITS OF RAPID BNP TESTING

Dr. Christian Mueller and colleagues tested the hypothesis that a rapid BNP-guided diagnostic strategy would impact time to discharge and total cost of treatment in patients presenting with acute dyspnea. Since BNP levels are reliably elevated in



CHF, Biosite's 15-minute Triage BNP Test may help to reduce diagnostic uncertainty in these patients.

"If you have a test that improves diagnosis, you can start appropriate therapy earlier." — Dr. Christian Mueller

METHODOLOGY: COMPARE LENGTH OF STAY AND COST WITH AND WITHOUT BNP

Dr. Mueller and colleagues randomly assigned 452 short of breath patients to one of two groups: (1) those managed with the aid of rapid BNP Testing (BNP Group, n=225) or (2) those managed without BNP levels (Control Group, n=227). Total treatment time (length of stay) and total cost of treatment were the primary end points.

RESULTS: SIGNIFICANT REDUCTION IN TIME TO TREATMENT, LENGTH OF STAY AND COST

Time from presentation to appropriate treatment was reduced by 30% (63 versus 90 minutes) with the use of rapid BNP testing in the ED.

The use of rapid BNP levels reduced the need for hospital admission by 10 percentage points (75% of the BNP Group were admitted versus 85% of the Control Group). ICU admission rates showed a similar trend at 15% versus 24%. The length of stay for rapid BNP Testing Group patients was 3 days less (8 days versus 11 days) than the Control Group. The costs of treatment were $5,410 and $7,264, respectively. The treatment cost difference of $1,854 per patient between both groups, equates to $417,150 for the entire rapid BNP Testing Group. In-hospital mortality was 6% for the rapid BNP Testing Group and 9% for the Control Group. Patients in both groups were well matched in demographic and baseline clinical characteristics.

CONCLUSION

When used in combination with other clinical information, rapid BNP levels in approximately 15 minutes significantly improved the evaluation and management of patients with acute dyspnea in the ED. Rapid BNP testing not only resulted in a significant reduction in time to treatment, it also ultimately led to substantial cost savings.

"The BNP test is a major step forward in the management of patients presenting with dyspnea." — Dr. Christian Mueller

Study data reprinted with permission from the study authors Mueller C. Brain natriuretic peptide for Acute Shortness of Breath Evaluation: a randomized comparison (BASEL). Presented at the ESC Congress 2003; August 30-September 3, 2003; Vienna, Austria. Hot Line I: Medical Treatment/Heart Failure, Presentation #84.
Mueller C, Scholer A, Kirsten LK, Martina B et al. Use of B-Type Natriuretic Peptide in the Evaluation and Management of Acute Dyspnea. N Eng J Med 350;7 Feb 12,2004

Footnote: This document describes the BASEL Study (B-Type Natriuretic Peptide for Acute Shortness of Breath Evaluation), supported by research grants from the Swiss National Science Foundation, the Swiss Heart Foundation, the Novartis Foundation, the Krokus Foundation, and the University of Basel (to Dr. Mueller). Diagnostic devices and reagents (Triage®) were provided by Biosite, San Diego, California.

EXPERIMENTAL DESIGN

- 452 - patient randomized trial
- 225 patients managed with BNP (BNP group)
- 227 patients managed without BNP (Control group)

RESULTS

With Rapid BNP Testing:

- ↓ Total cost difference = $417,150
- ↓ Time to treatment reduced by approximately 30 minutes
- ↓ Admission rates dropped (75% vs 85%)
- ↓ ICU admissions rates fell (15% vs 24%)
- ↓ LOS shortened by 27% (8 vs 11 days)
- ↓ Cost of treatment reduced by 26% ($5,410 vs $7,264)

CLINICAL AND ECONOMIC IMPACT USING RAPID BNP TESTING

	Control Group (n=227)	BNP Group (n=225)
% patients admitted to hospital	85%	75%
% patients in ICU	24%	15%