

CRITICAL REVIEW FORM: THERAPY

Citation: Schneider HG, Lam L, Lokuge A, et al; B-Type Natriuretic Peptide Testing, Clinical Outcomes, and Health Services Use in Emergency Department Patients With Dyspnea, *Annals of Internal Medicine* 2009; 150: 365-371.

Guide		Comments
I	Are the results valid?	
A	<i>Did experimental and control groups begin the study with a similar prognosis?</i>	
1	Were patients randomized?	Yes. This was a randomized, controlled, single-blind trial. Randomized to have BNP tested or not tested. Decided by random numbers from a computer generated table, and placed in a sealed envelope.
2	Was randomization concealed?	Patients were told they were entering a randomized study. Patients were blinded. Blood was collected from every patient in the same way. Physicians were not blinded and used the BNP results in their treatment plan and diagnosis.
3	Were patients analyzed in the groups to which they were randomized?	Yes. Background information such as age, sex, smoking status, htn, heart failure, DM, renal failure, ischemic heart disease, afib, COPD, and initial vitals were analyzed.
4	Were patients in the treatment and control groups similar with respect to known prognostic factors?	Some important differences do exist. Age, Sex, smoking status, ischemic heart disease, afib, DM, Renal failure, and all physical symptoms except orthopnea were similar. However in the BNP group htn and heart failure more common. HTN in BNP vs no BNP was 170 and 138 respectively. Large difference. Also heart failure in BNP group much larger. Heart failure as per the definition from the European Society of Cardiology. Heart failure in BNP vs no BNP was 123 and 97 respectively. Large difference. Also pts were from 2 different academic hospitals in Australia. 199 pts from The Alfred and 107 pts from The Northern Hospital. The Alfred hospital environment with more influence on results.
B	<i>Did experimental and control groups retain a similar prognosis after the study started?</i>	

1	Were 5 important groups (patients, caregivers, collectors of outcome data, adjudicators of outcome, data analysts) aware of group allocation?	Patients were the only certain party blinded. Nurses drew the same blood for every patient, but would see results potentially. Physicians were not blinded and used results to make clinical decisions. There is no mention of data analysts being blinded to group assignment. Unclear which parties in the statistical portion were blinded or not blinded.
2	Aside from the experimental intervention, were groups treated equally?	Yes. Refer to Table 3 on pg 369. Difference between all interventions listed was negligible. Investigators included bronchodilator, diuretic, vasodilator, antibiotic, steroid, morphine, digoxin, amiodarone, ACE Inh, and Noninvasive ventilation. So same treatments at the two different hospitals as well essentially. Unclear why outcome differ so greatly between the two hospitals.
3	Was follow-up complete?	Yes. F/U was complete. All 612 pts were were contacted 30 days after discharge for f/u. Either the pts or the next of kin were contacted. Questions were asked readmission and death.

II		What are the results?
1	How large was the treatment effect?	<p>The primary outcomes measured were hospital admission rate, length of stay, and change in pt management.</p> <p>Secondary outcomes were 30 day mortality and readmission rates.</p> <p>Two physicians, one a cardiologist and the other ED reviewed all the lab data and imaging to make a final diagnosis. The purpose was to determine if dyspnea was caused by CHF or not. Not the primary aim of the paper. However useful to determine whether CHF was more prominent in either group. HF was the diagnosis in 44.8% in all pts from both groups (n=274). e This makes sense based on the prior medical history differences b/t the two groups. BNP elevation not subtle with CHF BNP median value 830 ng/l, with no CHF median BNP=99ng/L. BNP was accurate to differentiate b/t CHF and non-CHF as cause.</p> <p>Primary outcome: Table 2, page 369. NO statistical difference in the primary outcomes as detailed below</p> <ul style="list-style-type: none"> -hospital admission rate(n=306): BNP admit(262) vs No BNP admit(265) -length of stay: BNP(4.4 days) vs no BNP(5.0 days) -change in pt management: Table 3, page 369. No change in bronchodilator, diuretic, vasodilator, antibiotic, steroid, morphine, digoxin, amiodarone, ACE inh, and noninvasive ventilation <p>Secondary outcome:</p> <ul style="list-style-type: none"> -30 Day mortality:control(6.9%) vs BNP(6.5%) -Readmission rates:control(18%) vs BNP(15%) <p>Interestingly the Readmission rate at the two hospitals was markedly different. At The Alfred (8%) and at The Northern Hospital(4%) in both the control and the BNP group. Unclear why that is. Same treatment. Same duration of stay. I would want to go to The Northern Hospital if I was in Australia.</p>
2	How precise was the treatment effect?	Treatment was lab value. Lab value provided no effect on treatment or prognosis.
III		How can I apply the results to my patient care?
1	Were the study patients similar to my patient?	Yes. Prevalence of CHF per the paper is the same in Australia as in the USA. Results from two large Academic emergency departments. Unclear why the readmission rate was so different b/t two hospitals.
2	Were all patient- important outcomes considered?	Yes. Primary outcomes and secondary outcomes measured utility on a broad scale of BNP. As a side note, the authors addressed BNP utility in diagnosing CHF compared to clinical judgment. This 2 nd step broadens the scale of the study and more conclusions can be drawn, than might otherwise have been possible.

3	Are the likely benefits worth the potential harms and costs?	<p>No really potential harms associated with BNP other than increased cost for perhaps excessive and unnecessary lab test. This paper argues that using BNP as a broad test on all dyspnic patients regardless of clinical suspicion is not useful. While BNP may help in diagnosis of CHF, clinical suspicion has a very high positive predictive value by itself. Furthermore, BNP did not influence pt outcome, which is the endpoint of any intervention. No impact on readmission or the length of hospital stay, which would be key in cost differentiation. This paper suggests that role of BNP may be when clinician has low clinical suspicion of CHF as test to help “rule out” CHF as a cause. This seems to go against the other conclusions that the authors suggest.</p> <p>One of the papers weaknesses is the high difference in rate of readmission between the two facilities. This suggests that there may be more differences bt the care received at the facilities. The fact that one facility contributed 2/3 of the pts suggests that this differing environment could make a substantial difference in the results obtained. This would be offset if more than two facilities were used. Big limitation in my mind.</p> <p>Also will run through sources 25, 16,19,20, 24 briefly as would offer different perspectives.</p>
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