Provencher et al. [14] studied 92 patients undergoing CABG (n = 43) or valve surgery. BNP predicted postoperative cardiac dysfunction (P = 0.037, AUC 0.80). Suttner et al. [15] studied 98 consecutive older patients (mean age 78 years) undergoing CABG. NT-proBNP predicted postoperative cardiac events and death in-hospital (P = 0.001, AUC 0.92).

6.3. BNP levels as a predictor of postoperative AF in cardiac surgery

Studies by Ata et al. [17], 144 patients, P = 0.002, AUC 0.75, Akazawa et al. [18], 150 patients, P = 0.001, AUC 0.74 and Wazni et al. [19], 187 patients, P = 0.025, all found preoperative BNP independently predicted postoperative atrial fibrillation (AF) in CABG patients. Cuthbertson et al. [4] also found that preoperative NT-proBNP levels independently predicted the occurrence of postoperative AF (P < 0.001).

7. Clinical bottom line

Preoperative and postoperative measurement of natriuretic peptides may help predict postoperative cardiac dysfunction and outcome in cardiac surgical patients. However, BNP levels should be interpreted cautiously using clinical judgement.

References


eComment: Validity of brain natriuretic peptide as a marker for adverse postoperative outcomes in patients undergoing cardiac surgery

Authors: Shahzad G. Raja, Department of Cardiac Surgery, Harefield Hospital, Hill End Road, Harefield, London UB9 6JH, UK; Saad Chowdhury doi:10.1510/icvts.2010.252601A

We read with great interest the best evidence topic by Mitchell and Webb [1] evaluating current best available evidence to verify the validity of brain natriuretic peptide (BNP) as a marker for adverse postoperative outcomes in patients undergoing cardiac surgery. We feel that the clinical bottom line very nicely summarizes the current status of BNP as a predictor for adverse outcomes after cardiac surgery.

Natriuretic peptides (NPs) have been found to be useful markers in differentiating acute dyspneic patients presenting to the emergency department and emerged as potent prognostic markers for patients with congestive heart failure (CHF). The best-established and widely used clinical application of BNP and NT-proBNP testing is for the emergent diagnosis of CHF in patients presenting with acute dyspnea. BNP and NT-proBNP, as the European Society of Cardiology recommended, are helpful in the diagnosis of HF and providing prognostic potential; as well as at a low-normal concentration in untreated patients makes HF unlikely as the cause of symptoms [2]. The Food and Drug Administration (FDA) approved a cutoff value of BNP for the diagnosis of CHF as 100 pg/mL. In NT-proBNP, the optimal cutoff values for confirmatory decision limits for CHF are 450, 900 and 1800 pg/ml for ages <50 years, between 50 and 75 years, and older than 75 years of age. The exclusionary decision limit of NT-proBNP for cardiogenic acute dyspnea in all ages is <300 pg/ml [3].

BNP levels are influenced by age, gender, and, to a surprisingly large extent, by body mass index. In addition, it can be elevated in a wide variety
of clinical settings with or without CHF. BNP is elevated in other cardiac disease states such as the acute coronary syndromes, diastolic dysfunction, atrial fibrillation, amyloidosis, restrictive cardiomyopathy, and valvular heart disease. BNP is elevated in non-cardiac diseases such as pulmonary hypertension, chronic obstructive pulmonary disease, pulmonary embolism, and renal failure. BNP is also elevated in the setting of critical illness, such as in acute decompensated CHF and sepsis [4]. This variation across clinical settings has significant implications given the increasing frequency with which BNP testing is being performed. It is therefore important for clinicians to understand how to appropriately interpret BNP in light of the comorbidities of individual patients to maximize its clinical utility.

Despite all the aforementioned potential indications for the role of BNP as a diagnostic and prognostic marker it must, however, be reiterated that currently the only reasonable practical application of BNP as a marker is limited to differentiation of acute dyspnea, monitoring of therapeutic responses, and prognosis of acute or decompensated CHF.

References


eComment: Is NT-proBNP a marker for adverse postoperative outcomes in patients undergoing lung and esophageal surgery?

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We have read with great interest the article by Mitchell and Webb [1] and the eComment by Raja and Chowdhury [2] reporting on the validity of NT-proBNP as a marker for adverse postoperative outcomes in patients undergoing cardiac surgery. Biochemical markers of myocardial injury play an essential role in the diagnosis, prognosis, risk assessment and therapeutic guidance of patients presenting with a spectrum of cardiac conditions. In patients undergoing cardiac surgery, the procedure itself is usually associated with increased levels of a whole variety of inflammatory and cardiac myocyte damage markers. In addition, many biochemical markers may already be deranged preoperatively as a result of pre-existing pathology. The question is whether any of these observations can be usefully equated to diagnostic or prognostic information, and indeed whether such information provides additional information to that already provided by what is already known about the patient. It is obvious that patient with high brain natriuretic levels will exhibit an adverse outcome after every kind of surgery or in medical therapy. As cardiac troponins show the myocardial damage, patients with higher levels of troponin are at risk of heart failure or death after myocardial infarction. Like the preoperative low glomerular filtration rate or high creatinin levels are at risk for postoperative renal insufficiency. Clearly cardiac surgery patients may present with dynamic deviations in the levels of a whole variety of cardiac biomarkers. This may be as a result of preoperative pathological status or as a result of the surgery and subsequent progress, including complications. The exact usefulness of measuring the levels of some of these markers needs to be assessed following adjustment for other known factors that are known to predict outcome. The next step would be to use such knowledge and assess whether outcomes can be modified in previously identified high-risk groups.

References


eComment: B-type brain natriuretic peptide dynamics in surgical treatment of cardiological patients

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Estimation of brain natriuretic peptide (BNP) is gradually becoming a standard in heart failure diagnostics. Data from other sources [1, 2] and results of our own studies [3, 4] both confirm that BNP level has a very high prognostic value in the assessment of heart failure risk and fatal outcome after surgical correction of acquired and congenital heart disease. In our investigation we explored BNP levels before and after surgical treatment performed on 52 adult patients with valvular heart disease, dilatation and diminished left ventricular contractile function (LVdD > 60 mm, LVEF ≤ 50%), average age 45.0 ± 13.0 years, as well as on 41 children with tetralogy of Fallot, average age 2.0 ± 0.9 years. The investigation proved that BNP level is characterized by reliable correlation with heart failure functional class. In the early postoperative period, initial BNP level correlated with the dose...
and duration of cardioactive support applied, as well as with the necessity for introduction of circulatory assist devices. The number of days spent in intensive care unit was also closely connected to the initial BNP level. Among deceased patients and patients with a postoperative period complicated by heart failure, BNP levels were considerably higher compared to other patients.

References


