**Small Group Worksheet — Cases**

**Case 1**: A 50-year-old woman with a history of hypertension and diabetes presents to her primary care office for a routine visit. She denies any dyspnea, weight gain, lower extremity edema, orthopnea or paroxysmal nocturnal dyspnea (PND). She has no lower extremity edema or distended neck veins. Cardiac exam reveals normal heart sounds.

**Case 2**: A 50-year-old woman with a history of hypertension and diabetes presents to her PCP office with several weeks of increasing dyspnea on exertion and lower extremity edema. She has started sleeping at an angle due to shortness of breath at night. She denies any weight gain or PND. She has JVD, lower extremity edema and normal heart sounds on exam.

**Case 3**: A 50-year-old woman with a history of hypertension and diabetes presents to the emergency department with several weeks of increasing dyspnea on exertion and lower extremity edema. She has started sleeping at an angle due to shortness of breath at night. She denied any known weight gain or PND. She has lower extremity edema, JVD, and a third heart sound on exam.

**Questions:**

1. What is your overall clinical impression that the patient has heart failure (Yes/No)?
2. What is your estimate of your patient’s pretest probability for heart failure (hint: consider risk factors and clinical setting)? Compare your estimate with the numbers provided in Table 1.
3. Use the likelihood ratios provided in Table 2 and the likelihood ratio nomogram to determine how the pre-test probability of heart failure changes with your exam findings.
4. Based on your initial pretest probability estimate, would you perform serum BNP testing to evaluate for heart failure? Why or why not? What would you estimate the LR of BNP testing to be for heart failure in this patient?
5. Using your estimated pretest probability of disease, use the likelihood ratios in Table 3 and the nomogram to assess how BNP testing might influence your posttest probability of disease in your patient. Consider BNP results of <50, >= 100, and >= 200 (pg/ml).

**Table 1. Pretest Probabilities for Heart Failure in Different Clinical Settings**

**(based on overall prevalence of heart failure in that population)**

|  |  |
| --- | --- |
| Patients presenting to PCP asymptomatic | 2% |
| Patients presenting to PCP asymptomatic, with at least 1 risk factor (HTN, DM, MI, angina, etc) | 7% |
| Patients with suspected heart failure in PCP setting | 27% |
| Patients with dyspnea in the ED setting | 50% |

**Table 2. Likelihood Ratios for Physical Exam Findings:**

|  |  |
| --- | --- |
| Overall initial clinical gestalt | (+) 4.4 , (-) 0.45 |
| Lower extremity edema | (+) 2.4, (-) 0.64 |
| Jugular venous distension | (+) 5.1, (-)0.64 |
| Third heart sound | (+) 11, (-) 0.88 |

**Table 3. Likelihood Ratios for BNP Testing:**

|  |  |
| --- | --- |
| BNP Level (pg/ml) | Likelihood Ratio |
| < 50 | (+) 1.7, (-) 0.06 |
| >= 100 | (+) 2.7, (-) 0.11 |
| >= 200 | (+) 3.7, (-) 0.11 |

**Adapted from:**

Wang CS, Fitzgerald JM, Schulzer M, et al. Does this dyspneic patient in the emergency department have congestive heart failure? *JAMA*. 2005;294:1944-1956.

**Likelihood Ratio**

