

Review: Medical history, physical examination, and routine tests are useful for diagnosing heart failure in dyspnea

Wang CS, FitzGerald JM, Schulzer M, Mak E, Ayas NT. Does this dyspneic patient in the emergency department have congestive heart failure? *JAMA*. 2005;294:1944-56.

Clinical impact ratings: Emergency Med ★★★★★☆ GIM/FP/GP ★★★★★☆ Hospitalists ★★★★★☆ Cardiology ★★★★★☆

QUESTION

In patients presenting to the emergency department (ED) with dyspnea, how useful are medical history, physical examination, and readily available tests in diagnosing heart failure (HF)?

METHODS

Data sources: MEDLINE (1966 to July 2005) and reference lists of relevant articles and textbooks.

Study selection and assessment: English language studies that assessed the diagnostic accuracy of elements of the history, physical examination, or readily available tests in adults with undifferentiated dyspnea presenting to the ED. The reference standard was diagnosis by a panel of physicians based on clinical signs and symptoms and an appropriate measure of cardiac dysfunction. 2 reviewers independently assessed the studies for inclusion and methodological quality.

Outcomes: Pooled positive and negative likelihood ratios (LRs) for HF, calculated using a random-effects model.

MAIN RESULTS

22 studies met the selection criteria, but only 18 high-quality studies were included. Features assessed in > 1 study and found to be useful in diagnosing HF are in the Table.

CONCLUSIONS

In adults presenting to the emergency department with dyspnea, findings useful in ruling in heart failure include, in decreasing

order, pulmonary venous congestion, interstitial edema, third heart sound, history of HF, and jugular venous distention.

Findings useful in ruling out HF include, in decreasing order, a serum B-type natriuretic peptide level < 100 pg/mL and the absence of cardiomegaly, pulmonary venous

congestion, rales, dyspnea on exertion, and history of HF.

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Elements of clinical examination and routine diagnostic tests that were useful in diagnosing heart failure*

Diagnostic tests	Findings	Number of studies	Pooled sensitivity	Pooled specificity	Pooled +LR	Pooled -LR
Clinical judgment	—	4	61%	86%	4.4	0.45
History	Heart failure	7	60%	90%	5.8	0.45
	Myocardial infarction	6	40%	87%	3.1	0.69
	Coronary artery disease	4	52%	70%	1.8	0.68
Symptoms	Paroxysmal nocturnal dyspnea	5	41%	84%	2.6	0.70
	Orthopnea	8	50%	77%	2.2	0.65
	Dyspnea on exertion	2	84%	34%	1.3	0.48
Physical examination	Third heart sound	8	13%	99%	11	0.88
	Jugular venous distention	8	39%	92%	5.2	0.66
	Rales	8	60%	78%	2.8	0.51
	Any murmur	4	27%	90%	2.6	0.81
	Lower extremity edema	6	50%	78%	2.3	0.64
Chest radiograph	Wheezing	5	22%	58%	0.52	1.3
	Pulmonary venous congestion	4	54%	96%	12	0.48
	Interstitial edema	2	34%	97%	12	0.68
	Cardiomegaly	6	74%	78%	3.3	0.33
Electrocardiogram	Pleural effusion	2	26%	92%	3.2	0.81
	Atrial fibrillation	5	26%	93%	3.8	0.79
Serum BNP	Any abnormal finding	2	50%	78%	2.2	0.64
	≥ 100 pg/mL	10	93%	66%	2.7	0.11

*Diagnostic terms defined in Glossary. BNP = B-type natriuretic peptide

COMMENTARY

Patients with acute dyspnea present clinicians with an urgent and often difficult diagnostic challenge. The initial treatments for the alternative diagnoses differ and must usually be started before definitive test results are known. In this well-reported systematic review, Wang and colleagues identified studies of reasonable quality evaluating the accuracy of the clinical findings and simple tests that most clinicians actually use to confirm or exclude HF. To maximize the usefulness of this review, clinicians must consider the LRs associated with the presence or absence of each criterion in relation to the importance they currently place on that criterion in this setting and revise their diagnostic heuristics accordingly.

Some of the findings of this review fit conventional wisdom. Elements of the history of the present illness, previous history, and electrocardiographic findings are not as strong as radiographic findings for ruling in HF, while selected physical findings are of intermediate diagnostic strength. The LR reported by Wang and colleagues for overall clinical judgment reflects awareness of chest radiography results and would probably be closer to 1 in its absence. Presence of a third heart

sound, although a strong predictor, may be difficult to detect in a noisy ED. When uncertain, clinicians might pay more attention to jugular venous distention to help rule in HF. Surprisingly, the presence of dyspnea on exertion has little effect on raising the likelihood of HF, although as expected, its absence lowers HF likelihood. The diagnostic irrelevance of a history of chronic lung disease is also unexpected.

Among the criteria reported by Wang and colleagues, only a B-type natriuretic peptide level < 100 pg/mL has more than a modest effect in decreasing the likelihood of HF. The reported -LR is consistent with those of other analyses, but its effect may be inflated by the use of fixed cutoffs in the primary studies (1). Such promising tests as abdominojugular reflex and new T-wave changes on electrocardiogram require further study.

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Reference

- Hohl CM, Mitelman BY, Wyer P, Lang E. *Can J Emerg Med*. 2003;5:162-5.