



Caring For People With Pneumonia

Patients with a low probability of dying based on a specific set of criteria should usually not initially be hospitalized for lower respiratory infections.

PNEUMONIA AND OTHER lower respiratory infections (LRIs) are a leading cause of hospitalization and death in nursing facilities, studies have found, especially among patients with Alzheimer's disease and other dementias. Past examinations of death certificates indicate that 50 to 70 percent of patients with dementia ultimately die of pneumonia.

Yet a more recent study found that more than 50 percent of patients with LRIs are in most cases good candidates for treatment in the nursing facility and generally should not be hospitalized. Results of the "Missouri LRI Study," which looked at patients in 36 nursing facilities in central Missouri and the St. Louis area, help demonstrate how best to diagnose pneumonia and other LRIs such as bronchitis and tracheobronchitis in nursing facility patients, how to decide whether to hospitalize a patient with an LRI, and how physicians and nursing staff can make better treatment decisions based on statistical analysis.

A Case In Point

Consider the case of an 83-year-old woman, who is a patient in a 120-bed nursing facility. She has moderately severe Alzheimer's, which has resulted in the need for extensive help with

most activities of daily living (ADLs), although she can eat and walk with limited assistance. She can answer yes or no questions about how she is feeling, but her speech is often incomprehensible. Her mood, dementia, and physical function have been relatively

stable over the past 90 days. Her weight is 145 lbs, and she is 5'3" tall. One morning she does not want to get out of bed, which is unusual. She has a new cough.

Vital signs show the following: temperature 98.0 degrees F orally, pulse 88, respiration 28, and blood pressure 146/70. The charge nurse hears crackles on lung examination, which have not been present before. However, there is no change in the patient's chronic confusion or her alertness.

Reaching A Diagnosis

This patient has suffered a significant change of condition, which should raise the suspicion of pneumonia, even if there is no fever. Furthermore, oral temperatures may be unreliable when the respiratory rate is increased. The "Missouri LRI Study" found that only 44 percent of patients with possible or probable pneumonia on chest X-ray had a temperature of 100.4 degrees F or more. However, 92 percent had at least one lower respiratory symptom, such as cough, new or increased spu-

'Missouri LRI Study' Risk Score Table
(Estimating 30-Day Mortality From LRI In Nursing Facility Patients)

VARIABLE	VALUE	POINTS ASSIGNED
BUN	16.0 or less	0
	16.1 up to 27	1
	27.1 up to 38	2
	38.1 up to 49	3
	49.1 up to 60	4
	60.1 up to 71	5
	More than 71	6
White blood cell count (10 ⁹ cells/L)	14.0 or less	0
	14.1 up to 24	1
	More than 24	2
Absolute lymphocyte count (10 ⁹ cells/L)	More than 0.8	0
	0.8 or less	1
Pulse (beats/minute)	72 or less	0
	73 up to 102	1
	103 up to 132	2
	More than 132	3
Gender	Female	0
	Male	1
Body mass index (kg/m ²)	31.0 or more	0
	25.1 up to 31.0	1
	19.1 up to 25.0	2
	13.1 up to 19.0	3
	13.0 or less	4
Help with ADLs	0	0
	1 or 2	1
	3 or 4	2
Mood deterioration over past 90 days	No	0
	Yes	2
Sum of item scores		

To derive risk score, add points. Risk of 30-day mortality is: 1-4 points, 2.4%; 5-6 points, 6.9%; 7-8 points, 15.6%; 9-10 points, 34.5%; 11-17 points, 61.6%.

Source: "Missouri LRI Study"

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tum production, or shortness of breath.

Furthermore, 80 percent had three or fewer respiratory or general symptoms or signs. Examples of general signs and symptoms include fever, decreased activity, new or increased falls, and increased confusion.

Pneumonia should definitely be a consideration where there is a significant change of condition associated with any lower respiratory symptom. There are, of course, other conditions that can cause lower respiratory signs and symptoms, including the common cold (cough and sometimes fever) and

congestive heart failure (cough, shortness of breath, abnormal lung findings). In the “Missouri LRI Study,” patients were considered to have an LRI if they had either: 1.) pneumonia on chest X-ray and two of six symptoms or signs suggestive of a lower respiratory infection (*see box, below*); or 2.) three of the same six symptoms and signs.

However, if pneumonia is not present, a fever is also required if the patient has chronic obstructive lung disease or congestive heart failure to avoid confusing an exacerbation of one of those conditions with an infection.

The patient’s physician is called and orders a chest X-ray, complete blood count, and a chemistry panel. The chest X-ray shows an infiltrate suggesting pneumonia. The blood count includes a white blood count of 10.0×10^9 cells per liter with 70 percent granulocytes and 20 percent lymphocytes. The chemistry panel includes blood urea nitrogen (BUN) of 22.

The patient has pneumonia and, even if the chest X-ray were negative, would qualify as having an LRI unless chronic obstructive lung disease or congestive heart failure were present. Not all physicians order chest X-rays

Defining LRIs

The six symptoms and signs used in defining an LRI are:

- New or increased cough;
- New or increased sputum production;
- A fever greater than or equal to 100.4 degrees F;
- Pleuritic chest pain;
- New or increased physical findings on chest examination (crackles, rhonchi, wheezes, bronchial breathing); and
- One of the following indications of change in status or breathing difficulty: new or increased shortness of breath, respiratory rate greater than 25, or worsening mental or functional status (significant deterioration in cognitive status or the ability to carry out ADLs).

Source: “Missouri LRI Study”

and laboratory studies for patients like this one. However, in this patient, if laboratory and X-ray studies were not done, some further evaluation (direct examination by the physician, for example) would be needed to rule out other causes for cough and rapid respiratory rate. On the other hand, if fever of at least 100.4 degrees F were present, the presumption of pneumonia would be strong even without a chest X-ray. In the “Missouri LRI Study,” patients with fever, lung crackles, and the other findings described above had on average a 56 percent probability of having pneumonia.

Determining Care Goals, Treatment

Having reached a diagnosis, it is important to consider the goals of care that have been established for the patient and whether they remain appropriate before deciding on treatment. For example, most patients with moderate dementia would have as a primary goal maintaining function. But with severe dementia, comfort might become the primary goal. Where comfort care is the primary goal, hospitalization would usually not be considered and antibiotics might become optional. Particularly in patients with severe dementia, an episode of pneumonia should at minimum alert physicians and nursing facility staff to the possible need to discuss with family or other designated decision makers whether to revise care goals.

A recent study found that more than 50 percent of persons with severe dementia hospitalized with pneumonia died within six months even with aggressive treatment.

Once care goals are reviewed, the next step is deciding on treatment, including whether the patient should be treated in the nursing facility or hospitalized. One of the principal findings of the LRI study is that many patients are at relatively low risk for dying from an LRI and, thus, usually are appropriate candidates for nursing facility treatment. If feasible, nursing

facility treatment is potentially advantageous to patients because they remain with familiar caregivers in a familiar setting.

Hospitalization is often hazardous for nursing facility patients and may result in complications, such as delirium, urinary catheterization, and the

development of pressure ulcers. In deciding on nursing facility vs. hospital care, estimating the probability of dying from an LRI is a useful step.

Risk Score Assistance

As a guide to treatment decisions, the “Missouri LRI Study” risk score pro-

vides an estimate of 30-day mortality based on eight characteristics: BUN, white blood cell count, lymphocyte count, pulse rate, gender, body-mass index, ADL function, and whether mood has deteriorated in the past 90 days. The first two are established through blood tests (a complete blood count and a BUN). Body-mass index is calculated from height and weight. The last two are based on minimum data set items, ADL self-performance ratings (G1e, G1h, G1i, G1j), and change in mood (E3). (See “Missouri LRI Study” Risk Score Table, page 33.

To consider the score for the patient described above, refer then to the LRI study risk score table. Since the patient’s BUN is 22, she receives 1 point for that. White blood count is only 10, which translates to 0 points. To obtain lymphocyte count, multiply white blood count times percent lymphocytes expressed as a decimal.

Further analyses in progress are looking at potential advantages or disadvantages of hospitalization for higher-risk patients.

Multiplying 10×0.2 equals 2, which is greater than 0.8, so no points are received. A pulse of 88 translates to 1 point. Being female translates to 0 points. Body-mass index is calculated as weight in kilograms divided by the square of the height in meters. The patient’s height and weight give a body-mass index of 25.8, or 1 point.

Finally she gets 1 point for ADL function (extensive assistance with grooming and toileting) and no points for mood deterioration. The patient’s total score is thus $1 + 0 + 0 + 1 + 0 + 1 + 1 + 0 = 4$. This score is associated on average with 2.4 percent mortality. With such a score, initial treatment with antibiotics in the nursing facility would usually be appropriate.

Mortality Risk As Guideline

There is no hard and fast rule as to what mortality level is too high for care in the nursing facility. However, in the “Missouri LRI Study,” 52 percent of patients had a score of 0-6, with low or relatively low associated mortality risk (2.4 percent for a score of 0-4 and 6.9 percent for a score of 5-6). Further analyses in progress are looking at potential advantages or disadvantages of hospitalization for higher-risk patients, and it is not clear even in these patients if those hospitalized are more likely to survive.

In summary, pneumonia is a prevalent disease in nursing facility patients that may present with limited symptoms and signs, including the absence of fever.

After a diagnosis is made, goals for treatment may need to be reviewed. Then if hospitalization would be a consideration, the “Missouri LRI Study” risk score may help decide whether the patient has a relatively low probability of dying. Patients with low or relatively low risk are likely to be good candidates for nursing facility treatment. Recognizing that on average 15 percent of nursing facility patients with an LRI die within 30 days, even patients with moderate risk of dying (score 7-8) may in many cases be appropriate for initial nursing facility treatment. ■

For More Information

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