

New analysis points the way to earlier diagnosis of chest tumors

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Researchers led by St. Jude Children's Research Hospital scientists have developed new diagnostic criteria to enable clinicians to distinguish malignant cancerous chest cavity masses from those caused by fungal histoplasmosis infection.

Scientists' analysis of the symptoms, laboratory tests and CT scans of patients with such "mediastinal" masses offers the potential for earlier diagnosis of such cancers and reduction of unnecessary biopsy surgery for children with such masses.

The researchers, led by Elisabeth Adderson, M.D., an associate member of the St. Jude Department of Infectious Diseases, published their findings in the July 22 issue of the *Journal of Pediatrics*.

"The problem has been that there are both benign and malignant causes of mediastinal masses. Sometimes the malignant masses are rapidly progressive and life-threatening, and therefore it is important to make a prompt diagnosis," said Adderson, corresponding author of the research. "In contrast, the benign causes, principally the fungus histoplasmosis, are often self-limiting or respond to drugs. And in some parts of the country, particularly the Ohio and Mississippi River valleys, the infectious causes of mediastinal masses are more common than the malignant causes."

Such malignancies include lymphomas and "neurogenic tumors" such as neuroblastomas, which arise from nerve cells. Besides histoplasmosis, tuberculosis can also produce mediastinal masses.

Distinguishing the malignant and benign causes of mediastinal masses has been challenging for practitioners in areas prone to histoplasmosis, because no individual symptom, laboratory test or radiological feature was sensitive enough to tell them apart, Adderson said. As a result, patients often had to undergo invasive biopsy surgery for diagnosis.

To improve diagnosis and avoid such surgeries, Adderson and her colleagues analyzed the health records of 131 patients with mediastinal masses seen at St. Jude and Le Bonheur Children's Hospital. The two hospitals are uniquely situated to do such studies because they provide almost all care for children with mediastinal masses in the region. In 104 of the 131 patients, the masses were benign.

"We looked at all aspects of their cases," Adderson said. "This included their symptoms, records of physical examinations, laboratory tests and diagnostic imaging results. And we tried to use all these to come up with a better way to refine diagnoses."

The symptoms included unexplained fevers, drenching night sweats, unintentional weight loss, headache, cough, chest pain, neck swelling and malaise. The [laboratory tests](#) included blood tests for the histoplasmosis organism and for a lowered white blood cell count—in particular abnormally low levels of lymphocytes, called lymphopenia. The radiology tests included evidence on computerized tomography scans of mediastinal masses and enlarged lymph nodes.

"Like previous investigators, we found that there was no single clinical, laboratory or radiologic feature that was good enough by itself to distinguish malignant from benign masses," Adderson said. And, like other researchers, they found that masses located in front of the heart were more likely to be malignant.

"But the unique feature that we identified, not previously recognized ,

was that the presence of lymphopenia and of enlarged cervical lymph nodes on CT scans was more suggestive of a malignant diagnosis," Adderson said.

The next step in refining their findings so they can be applied clinically will be to systematically gather clinical data on patients at the time of their diagnosis. The problem with analyzing retrospective data is that the records and tests are not necessarily conducted and organized in the same way.

"Once we can ask each patient the same questions and perform diagnostic tests in the same way, we can substantiate our findings and analyze patient populations to formulate a standard diagnostic procedure," Adderson said. In areas of the country where tuberculosis rather than histoplasmosis is a predominant problem, similar analyses can be done to distinguish tubercular masses from cancerous ones.

Provided by St. Jude Children's Research Hospital

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