

Talcum powder stunts growth of lung tumors

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Talcum powder has been used for generations to soothe babies' diaper rash and freshen women's faces. But University of Florida researchers report the household product has an additional healing power: The ability to stunt cancer growth by cutting the flow of blood to metastatic lung tumors.

The study, published in the *European Respiratory Journal* in April, reveals that talc stimulates healthy cells to produce endostatin, a hormone considered the magic bullet for treating metastatic lung cancer. The UF researchers say talc is an exciting new therapeutic agent for a cancer largely considered incurable.

“We found, to our surprise, that talc causes tumor growth to slow down and actually decreases the tumor bulk,” said Veena Antony, M.D., a professor of pulmonary medicine and chief of pulmonary and critical care medicine at UF's College of Medicine. “Talc is able to prevent the formation of blood vessels, thereby killing the tumor and choking off its growth. The tumors appeared to grow much slower and in some cases completely disappeared.”

Scientists have only recently discovered that talcum powder stunts tumor growth, though the mineral has been used for almost 70 years to treat the respiratory problems that accompany metastatic lung cancer. About half of all patients accumulate fluid around the surface of the lungs, a condition known as malignant pleural effusion.

“That fluid can press down upon the lung, impair the breathing of the

patient and cause the patient to feel very short of breath,” said Antony.

Pleural effusions indicate that the cancer, which might have started in the breast, lung or gastrointestinal tract, has spread throughout the body. The prognosis for the roughly 200,000 patients afflicted with this condition is poor: Many die within six months.

To make life more bearable for these patients, doctors close the extra space between the lung and the chest wall, where the troublesome fluid collects. The trick is gluing the two surfaces together. Talc is blown into the patients’ chest cavity to irritate the tissue and create tiny abrasions. When the lung tissue heals, it becomes permanently adhered to the chest wall without impairing the patients’ breathing. The effects of the procedure, called medical thoracoscopy with talc pleurodesis, are immediate and last a lifetime.

“Shortness of breath is a horrible way to die,” Antony said. “The procedure spares the patient and the family the misery of watching their loved one suffer. It’s been used very extensively in Europe but it’s had slower acceptance (in the United States), perhaps because of the need to learn a new technology.”

The Food and Drug Administration approved talc for use in medical thoracoscopy in 2003, but UF is one of just a handful of U.S. institutions that perform the outpatient procedure on a routine basis.

Doctors have noticed that patients who undergo medical thoracoscopy with talcum powder live up to 18 months longer than expected. To figure out why, Antony compared lung fluid from 16 patients with malignant pleural effusions before and after doctors dusted their lungs with talc. The results were startling.

“We were surprised to find that talc has added benefits besides causing

scarring and taking away the fluid that surrounds the lung,” Antony said. “The cells that cover the lining of the lung are stimulated by the presence of talc to produce a factor that inhibits the growth of blood vessels and kills the tumor cells themselves.”

Less than one day after treatment with talc, patients began producing 10-fold higher levels of endostatin, a hormone released by healthy lung cells. Endostatin prevents new blood vessels from forming, slows cell growth and movement, and even induces nearby tumor cells to commit suicide. All of these make it hard for tumors to grow and spread into healthy lung tissue.

When endostatin was first discovered in 1997, doctors hoped its tumor-fighting properties would lead to a cure for cancer. But clinical trials have been disappointing, possibly because most clinicians have injected the hormone directly into patients. The hormone breaks down in the body before it has a chance to slow the spread of cancer, Antony said.

“It was there, it had a very short half life, it was gone,” Antony said. “What we’ve done is caused the normal pleural mesothelial cells to continue to produce endostatin. Talc doesn’t go away. Talc stays in the chest cavity, constantly causing the normal cells to produce this factor that inhibits the growth of the tumor.”

The antitumor effects of talc appear to be long-lasting, said Antony, who is continuing to investigate the long-term outcomes of patients who have undergone talc pleurodesis.

“It surprised us that such a cheap, easily available product, such an old-fashioned product, can have benefits to the patient and perhaps prolong the patient’s life,” Antony said.

Yossef Aelony, M.D., a clinical professor of respiratory and critical care

medicine at the Harbor-University of California at Los Angeles Medical Center, said the UF findings are an important milestone.

“This work will undoubtedly have a significant influence on future clinical trials dealing with the treatment of pleural malignancies, including lung cancer, mesothelioma and metastatic adenocarcinoma involving the pleural surfaces,” Aelony said.

Source: University of Florida

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