Visually-guided laser may be viable treatment for abnormal heartbeat

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(PhysOrg.com) -- A new treatment known as a visually-guided laser-balloon catheter successfully interrupted abnormal electrical pulses in patients and pigs with intermittent, irregular heartbeats, in a study reported in *Circulation: Arrhythmia and Electrophysiology*, a journal of the American Heart Association.

Severe cases of irregular heartbeat may require a procedure called ablation, which destroys a group of "misfiring" cells to stop abnormal electrical impulses that cause erratic heartbeats.

Investigators aimed at cells in the pulmonary veins that carry blood from the lungs to the heart. In the clinical part of the study, they ablated the misfiring cells with 100 percent accuracy. In 84 percent of the pulmonary veins treated, electrical pulses ceased after just one set of laser treatments. Three months after treatment, 90 percent of the treated veins remained inactive.

Unlike other catheters that rely on X-rays for visual guidance, in the new treatment doctors use a slender instrument called an endoscope that provides continuous real-time images. This allows investigators to aim the laser at precise locations in the pulmonary veins. The investigators destroyed cells in an overlapping pattern to completely "disconnect" them and prevent new electrical connections from forming later.

The study's clinical component included 27 patients, average age 53, two-thirds male, with diagnosed intermittent, abnormal heartbeat (called

paroxysmal atrial fibrillation, or PAF). All patients had tried at least one drug that did not relieve their symptoms.

For the animal model, the scientists examined pigs because their hearts are structured similar to humans. The investigators inactivated abnormally functioning pulmonary veins 97 percent of the time after the first set of laser-energy treatments. Four weeks later, 80 percent of the ablated veins were still inactive.

Additional research is needed to determine long-term safety and efficacy of balloon-guided, laser catheter, researchers said.

Atrial Fibrillation facts and statistics

• An estimated 2.2 million Americans are living with atrial fibrillation (AF).
• It's the most common "serious" heart rhythm abnormality in people over the age of 65 years.
• 11,438 deaths and 461,000 hospital discharges are attributed to AF per year, and about 75,000 new cases of AF are diagnosed each year.
• Stroke is 5 times more likely in people with AF compared to those without the condition.
• AF is responsible for at least 15% to 20% of all ischemic strokes.
• Data from the NHDS/NCHS (1996 -2001) on cases that included AF as a primary discharge diagnosis found the following:
- Approximately 44.8% of patients were men.
- The mean age for men was 66.8 years, versus 74.6 years for women.
- The racial breakdown for admissions was 71.2% white, 5.6% black, and 2.0% other races (20.8% were not specified).

Symptoms of atrial fibrillation

Some people with AF don’t feel a thing. Others notice an irregularity immediately. Symptoms may include:

- Racing, uncomfortable, irregular heartbeat
- “Flopping,” fluttering or thumping feeling in your chest
- Heart palpitations
- Dizziness
- Sweating
- Chest pain or pressure
- Difficulty getting your breath
- Overall weakness
- Fainting
- Fatigue during exercise.

Provided by American Heart Association