Restenosis or Thrombosis Sensing Stent

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Technology description

Over 600,000 cardiovascular stents are implanted each year and about 2-3% of those will fail within six months of surgery. Signs of stent failure can range from no symptoms at all to typical heart attack type symptoms. Restenosis and thrombosis are the most common culprits for stent failure. While the percent of stent failures is relatively low, the mortality rate among those that fail is much higher, especially considering that there may be no early signs of failure. Given the scale of stents that are implanted each year, 2-3% failure translates to tens of thousands of patients. The ability to target and use the stent itself to non-invasively monitor vessel environments could provide valuable information to healthcare providers and help identify potential complications before they become life threatening. Researchers at Arizona State University have developed a novel noninvasive sensing system that allows physicians to quickly and easily obtain information about the physical properties of the tissue surrounding a medical device. This system is wireless and easy to use, enabling more informed clinical decision to be made. When utilized in cardiovascular stents, this system can quickly and easily establish patency within the stent so that potentially lifesaving interventions can be implemented if there is a complication. This system could provide information that could save a life, even when a patient has no symptoms.
This simple and easy system observes physical properties of the surrounding tissue that can indicate problems with medical implants and transmits that information to clinicians so that more informed medical decisions can be rendered.

Application area

Method of diagnosing complications with medical implants
Stents (restenosis, thrombosis, aneurysm, biofilms, aortal tear, etc.)
Breast implants
Orthopedic implants

Advantages

Non-invasive – uses wireless monitoring to diagnose complications

Doesn’ t require imaging modalities that expose patients to excessive ionizing radiation such as CT
Does not require the use of costly specialized personnel
Sensors can be continuously or repeatedly pinged without causing tissue damage
Stents can be made of biocompatible materials and be produced using 3D printing processes

Institution

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