SMART CORONARY STENT ENDO-PROSTHESIS FOR THE REAL-TIME CORONARY HEART DISEASE MANAGMENT

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Abstract - The prevalence of Coronary Heart Disease in Pakistan is high; consequently a large amount of the population cannot afford to go for angioplasty or cardiac stent implantation, which is the standard treatment for blocked arteries in the treatment of this pathology. In an advanced study of intelligent medical devices we have explored the possibility of developing a coronary artery endo-prosthesis with a novel design, for treatment and monitoring of coronary heart disease. The proposed stent system is a prototype-based concept which is going to be integrated with a smart displacement sensor; this diagnostic tool is consolidated with a Radio Frequency (RF) component. The resulting product combines the advantages of a Coronary Stent system, along with non-invasive monitoring capabilities. The stage and progression of disease as well as any changing in-vivo conditions may be monitored by an external RF component, which can provide clinicians with real time patient alerts. In case of ambulatory patients who are not hospitalized, the ex-vivo (or active component) of the RF device can prompt the patient about their hospital visits, based on any changes in the internal pathology sensed by the in-vivo passive RF component. Along with the modification of the treatment plan without the need of expensive or invasive diagnostic procedures, this novel stent can act as a real-time monitoring system and help enormously in preventing problems caused by delay in diagnosis or treatment.

Index Terms - RF Communication, Real Time Monitoring, Coronary Stent, Auxetic Geometry.