Extracorporeal Shock Wave Therapy: A New Therapeutic Strategy for Coronary Artery Diseases

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Introduction

- Coronary artery disease (CAD), due to poor blood circulation, has been deliberated as one of the leading cause of death in the United States.
- The common mechanisms for treating CAD include stable medications, percutaneous coronary intervention (PCI) and coronary artery bypass graft surgery (CABG).
- Comparing traditional medications with a new type of therapy called Extracorporeal Shock Wave Therapy (ESWT), researches examine how ESWT is effective among adult patients in improving the symptoms of CAD.
- ESWT, in contrast to ultrasound, is a single acoustic pulse that creates high peak pressure with short duration and propagates energy to the target area without burning or tearing tissues in front of that.
- The mechanisms of ESWT are considered as practicable to prevent inflammation occurring in blood vessels and increase blood flow to myocardium.

What is Extracorporeal Shock Wave Therapy (ESWT)?

- ESWT was defined by International Society for Medical Shock Wave Therapy (ISMSW).
- It is a single sequence of sonic pulse that generates a sudden and high peak pressure up to one hundred MPa within a very short duration of 10 µsecond, and a frequency spectrum ranging from 16-20 MHz.
- ESWT propagates energy directly into target tissues without burning or tearing tissues in front of that.

Methods & Analysis

Clinical Studies
- MRI
- Six-minute walk test
- Canadian Cardiovascular Society (CCS) grading of angina
- New York Heart Association (NYHA) functional classification
- Seattle angina questionnaire (SAQ)
- Record the nitroglycerin dosage

Vivo & Animal Studies
- Rodent epigastric flap model
- Transgenic mouse model
- Quantitative immunohistochemical analysis
- Western blot analysis
- Microscopic evaluation
- Myocardial cytokine analysis
- Real-time polymerase chain reaction (PCR)

Results

- ESWT propagates energy directly into target tissues without burning or tearing tissues in front of that.
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Conclusion

- Extracorporeal shock wave therapy, a new therapeutic strategy has been examined for its effectiveness for treating coronary artery diseases.
- Studies suggest that ESWT at a low energy level (0.03 – 0.11 mJ/mm²) can significantly suppress myocardium inflammation and improve revascularization to the heart.
- Different regimens wouldn’t influence the efficacy of ESWT. Also, there is no evidence showing ESWT is invasive.

References