Presentation of a needle for direct or percutaneous myocardium stem cells injection

Nathan Valle Soubihe Junior¹, MD; Andre Schmidt¹, MD, PhD; Agnes Afrodite Sumarelli Albuquerque¹, BsC; Paulo Roberto Barbosa Evora¹, MD, PhD;

INTRODUCTION

Sutton et al. [1] wrote, in 1964, a brief historical review reporting that percutaneous introduction of a needle into the cardiac ventricular cavities of human beings was performed many years ago for therapeutic reasons. Summaries of indications and technics were published by Henschen [2] and Lauter [3]. The feasibility of obtaining ventricular myocardial specimens from human beings either by open or closed percutaneous routes was demonstrated in 1956 [4]. These old experiences proved that the heart tolerated these procedures very well, the myocardium quickly contracting around the small effect so that bleeding spontaneously ceased.

Studies on stem cells, based on laboratory data demonstrate functional improvement and reduction of myocardial ischemia when used in animals with acute myocardial infarction. Animal studies have shown different results, depending on the route used for the injection of the cells.

¹ Faculty of Medicine of Ribeirão Preto, University of São Paulo (FMRP-USP), Ribeirão Preto, SP, Brazil.

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Correspondence address:
Paulo Roberto Barbosa Evora
Department of Surgery and Anatomy, Faculty of Medicine of Ribeirão Preto, University of São Paulo
Avenida Bandeirantes, 3900 – Monte Alegre – Ribeirão Preto, SP, Brazil – Zip Code: 14048-900
E-mail: prbevora@fmrp.usp.br

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There is a clear superiority of results when direct myocardial injections are compared with intracoronary injections. Alternative methods of application of cell therapy products in myocardial infarction, acute or subacute, were tested. Direct injection as adjunctive therapy to revascularization surgery is a viable proposition, but it caters to a select group of patients referred for surgical revascularization immediately after an acute ischemic event [5-8].

The aim of this presentation is to describe a method of percutaneous puncture and injection of stem cells in the myocardium. This device is an adaptation Soubihe needle that was used in the fifties and sixties for myocardial biopsies [9].

METHODS

The instrument is equipped with a locking mechanism, which allows its perfect mobilization as one single unit for micro lesions, and it can be used only as a needle, so it becomes a biological injection instrument. The instrument for myocardium puncturing and injection of biological material is composed of an external needle, which contains at its end a blunt tip and multiple 0.5 mm diameter holes. Internally it is fitted with a blunt mandrill, which when introduced into the external needle, can be mobilized inside to fill the lateral holes occluding or releasing them. This instrument is harmless to myocardial fibers and coronaries as it had been proved when its first designed shape was used to perform heart biopsies, in the past (Figures 1 and 2).

DISCUSSION

A very important characteristic of this instrument is safety. The blunt end of the needle guaranties that during the punching process, in case of unexpected touch of a coronary artery, the vessel will not be hurt or cut, but the needle will slide sideways from it. Therefore, stem cells are injected into the heart while it is perfectly pumping, with the chest unopened. A real possibility is the direct intramyocardial injection during thoracotomy through specific or during the surgical treatment of coronary artery disease [10,11].
REFERENCES


