Introduction &Aim of the work

Over the last couple of decades allogeneic bone marrow transplantation was accepted as a therapy for a variety of hematological malignancies, bone marrow failure syndromes, immunedificiency states and metabolic disorders ***(Wagner et al, 1995)***

However,allogeneic bone marrow transplantation is limited by the availability of suitable HLA-compatible donors, risk of graft versus host rejection&risk of opportunistic infection **. (*Wagner et al,1995)***

Studies of the regenerating hematopoietic system have led to the definition of many of the fundamental principles of stem cell biology***.(Daly,et al,2003).***

Therapies based on a range of tissue stem cells have been widely touted as a new treatment modality, stem cells from embryonic and somatic sources to provide replacement cell therapies for genetic, malignant, and degenerative conditions***. (Daly, et al, 2003).***

There have been also many trials for stem cell use in advanced breast carcinoma, liver diseases (in animal model) &neurological disease, . ***(Margot et al, 2003)***

Recently there has been new interest for the use of stem cell therapy in cardiac diseases as coronary artery disease, congestive heart failure, cardiomyopathy&severe angina. . ***(Margot et al, 2003)***

Although most of these trials have been carried on small group of patients, they gave very promising results. ***(Margot et al, 2003)***

The body has natural way to regenerate itself, and the cardiovascular system is a part of it .Angiogenic cell precursors (ACPs) originates in the bone marrow and then circulates in the blood vessels play the major role. ***(Fulga et al, 2005)***

The VesCell is manufactured from small quantity of (ACPs) from blood and injected directly through a special technique into the heart muscle, and then it starts to regenerate special parts of the muscle. ***(Fulga et al, 2005)***

VesCell uses patients` own adult stem cells to treat heart disease and is a viable therapeutic possibility for heart patients without any other treatment option. ***(Fulga et al, 2005)***

Aim of the study

Write in details all information available on the use of stem cell in cardiac diseases to be able to asses its possible use clinically for treating cardiac diseases which are incurable by other forms of treatment

Methods

Search on all possible articles in the libraries and medical websites.

Stem cell therapy in cardiac disease

Essay

Submitted for Partial Fulfillment of master degree of
Clinical Hematology

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المقدمة

تعتبر عملية زرع نخاع العظم علي مرالعقدين الماضيين من أهم الطرق لإنقاذ المرضي من تأثير الإشعاعات القاتلة والكثير من أورام الدم والعلاج الكيماوي علي الدم وأيضا حالات نقص المناعة و بعض حالات الخلل فى العمليات الأيضية.

ويتم الحصول علي نخاع العظم من المريض نفسه أو من متبرع مطابق له من حيث نوع الخلايا لتجنب المضاعفات الخطيرة كالعدوى المتكررة وتفاعل خلايا المتبرع ضد خلايا المريض .

وتشير الكثير من الدراسات إلى القدرة الذاتية لتجديد خلايا الدم مما أدى إلى توجيه الأنظار إلى خلايا الدم الأم الجذعية كوسيلة لعلآج الكثير من لمراض.

ويعتبر هذا النوع من العلاج من أحدث الطرق المبتكرة حيث يتم الحصول على الخلايا الجذعية من دم الحبل السرى للأجنة أو من نخاع العظم للمريض نفسه.

وقد تم في الآونة الأخيرة الكثير من المحاولات لعلاج حالات سرطان الثدي وبعض أمراض الكبد (تجارب علي الحيوانات) وبعض الأمراض العصبية عن طريق خلايا الدم الأم الجذعية .

لقد زاد الاهتمام بخلايا الدم الأم الجذعية في علاج الكثير من أمراض القلب كانسداد الشريان التاجي وفشل القلب الإحتقاني وضعف عضلة القلب و الذبحة الصدرية الشديدة .

وبرغم قلة عدد المرضى الذين خضعوا لهذا النوع من العلاج إلا أنها أعطت نتائج مذهلة.

إن هذه العملية ببساطة تتم عن طريق الحصول على هذه الخلايا وحقنها مباشرة فى الأجزاء الميته من عضلة القلب لتبدأ الخلايا بتجديد نفسها.

يعتبر هذا النوع من العلاج الحل الوحيد للكثير من المرضى الذين لا يوجد لحالاتهم أى حلول أخرى و ذلك عن طريق خلاياهم الخاصة.

الهدف من الدراسة:

تجميع كل المعلومات الجديدة عن استخدام خلايا الدم الأم الجذعية فى علاج مرضى القلب.

استخدام خلايا الدم الأم الجذعية فى علاج امراض القلب

رسالة مقدمة من

طبيبة/رشا جلال على أحمد

بكالوريوس الطب و الجراحة – جامعة عين شمس

توطئة للحصول على درجة الماجستير فى أمراض الدم الإكلينيكية

تحت إشراف

الأستاذة الدكتورة/مها الزميتى

استاذ أمراض الدم الإكلينيكية

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مدرس/غادة متولى توفيق الجوهرى

مدرس أمراض الدم الإكلينيكية

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كلية الطب

جامعة عين شمس

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Abstract

The mesenchymal stem cells have a great therapeutic potential due to its ability to self renewal and differentiation into many types of specialized cells.

This character initiated the idea of using stem cells in treatment of many diseases related to permanent damage of the tissues such as cardiac diseases.

Over the past few years some experiments on animals revealed the success of the theory, and many human cases reported to be healthy after a myocardial infarction followed by stem cell therapy.

In this research we will try to spotlight the main characters of stem cell, its sources, how to increase its number and the modality of treatment of cardiac diseases by stem cells.

Index

List of abbreviations

ANC	Absolute Neutrophil Count
ACPs	Angiogenic Cell Precursors
BMT	Bone Marrow Transplantation,
CD	Cluster of Differentiation
CFU-S	Colony Forming Unit in the Spleen
CFU-GM	Colony-Forming Unit-Granulocyte-Macrophage
CBC	Complete Blood Count
CABG	Coronary Artery Bypass Graft
FISH	Fluorescence In Situ Hybridization
G-CSF	Granulocyte-Colony Stimulating Factor
GM-CSF	Granulocyte-Macrophage Colony Stimulating Factor
HGFs	Hematopoitic Growth Factors
HSC	Hematopoitic Stem Cell
HLA	Human Leukocyte Antigen
ID	Identification
IRV	Interstitial Retrograde Coronary Venous
IC	Intracoronary
IM	Intramyocardial
I.V	Intravenously
LVL	Large Volume Leukapheresis
L.V	Left Ventricle
LVEF	Left-Ventricular Ejection Fraction
MSCs	Mesenchymal Stem Cells
MCE	Myocardial contrast echocardiography

PBSC	Peripheral Blood Stem Cells
PBMNCs	Peripheral Blood Mononuclear Cells
PBPC	Peripheral Blood Progenitor Cells
rhG-CSF	recombinant human Granulocyte-Colony Stimulating Factor
RBCs	Red Blood Cells
SP	Side Population
TH2	T-Helper lymphocyte type 2
WBCs	White Blood Cells

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First of all thank Allah for granting me the ability to complete this work till it came to an end.

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