RESEARCH PROPOSAL

Title: Healing effect of mesenchymal stem cells on nonsteroidal anti-inflammatory drug-related peptic ulcer in albino rats

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AIMS AND OBJECTIVES:

To investigate the feasibility and effectiveness of sub mucosal injection of ADMSCs on the healing of Acetylsalicylic acid induced gastric ulcer in a rat model.

INTRODUCTION:

Nonsteroidal anti-inflammatory drugs (NSAIDs) are among the most important causes of peptic ulcer disease. Acetylsalicylic acid is use as an anti-inflammatory but because of its side effects restriction on its prolonged use limits its utility. Proton pump inhibitors are the current standard treatment; however, adverse effects of using these drugs are attracting more and more concerns in recent years.

In this study adipose-derived mesenchymal stem cells (ADMSCs) will be used in a rat model of Acetylsalicylic acid induced gastric ulcer
ADMSCs are adult multipotent cells isolated from adipose tissue of allogeneic rat donors. These cells are capable of multilineage differentiation and have potent paracrine activity of releasing cytokines, chemokines, and trophic factors. Studies have shown the capability of mesenchymal stem cells (MSCs) in enhancing healing of gastric pathology and perforation after surgical repair.

MATERIALS AND METHODS

Grouping of animals:

Adult male Albino rats weighing 250-300 g will be selected.
After acclimatization of two weeks the animals will be randomly divided into two groups A, B and C. Each group will further be subdivided into two subgroups each (A1, A2, B1, B2, C1, C2)

Materials:

The primary ADMSCs from five allogeneic rat donors, and test the potential of multilineage differentiation before storage in liquid nitrogen for experimental use.

Intervention:

1. The control group will be given saline injections (A1 and A2)
2. Acetyl salicylic acid 100mg/kg will be given to groups (B1 and B2)

3. Acetyl salicylic acid 100mg/kg will be given to groups (C1 AND C2) along with the stem cells will be delivered by submucosal injection

Data collection procedure:

We will be using recording forms to collect data and the variables included will be:

Macroscopic: ulcer index

Microscopic:

- Inflammatory infiltration
- Reepithelization
- Neovascularization

Inflammation markers:

- TNF α
- IL2

Methodology:

Animals from group A1, B1 and C1 will be sacrificed on day 7.

Animals from group A2, B2 and C2 will be sacrificed on day 14.

Stomach will be excised and examined in a standard position for ulcer index. Histological examination will be done to determine inflammatory infiltration, reepithelization and neovascularization. ELIZA will be done to measure TNF α and IL2.

Slides will be viewed under light microscopy. Samples will be photographically accessed and compared with histological findings.

Statistical analysis;

The data will be entered and analyzed using SPSS 25.0. Mean ±S.D will be given for quantitative variables. ANOVA will be applied to observe the mean differences among controls and experimental group. Post hoc Tukey test will be used for multiple comparisons.

Outcome and utilization

Acetylsalicylic acid induced gastric ulcers are a common problem. Adipose-derived mesenchymal stem cells injection may have potential as a new therapeutic strategy for gastrointestinal ulcers. It will be of great value in healing and preventing side effects caused by such drugs as hypothesized in this study.