SKIN CELL GUN – MINI REVIEW

ABSTRACT

Skin cell gun, is an innovative medical device used in the treatment of burns and wounds. In this device the injured person’s autologous stem cells are used which is a recent novel stem cell isolation technique that enhances the availability of stem cells for transplantation methods. The device is specially designed to spray the stem cells suspension on the burnt areas without exposing the stem cells to vanquish the conditions seen in general spray devices. Rapid wound healing is experienced in few days than in weeks or months. Generally when a skin wound is prone to the outside environmental conditions, that itself provides the best supplement’s for culturing of the stem cells. This review demonstrates the operation of skin gun, advantages and wound healing process.

KEY WORDS

Skin cell gun, Skin grafting, Tissue regeneration, Tissue processing etc.

INTRODUCTION

The skin cell gun is an advanced method which overcome the other conventional methods like skin grafting etc. the skin gun is a highly sophisticated technique where a stamp–sized skin of injured one is collected, for treating at the site of wound. Besides the skin gun, cell isolation methods are also implemented by Renovacare with their brand names SkinGun and CellMistSystems.[4][5]. Still the company is carrying out several researches in developing the technology for commercial establishment of their market. Along with treating the wounds and burns Renovacare is mobilizing its services in treating other sorts of conditions like pigmentation disorders, complexion treatment, chronic wounds and on cosmetic fields. This experimental system’s of device was introduced by Dr.Jorg Geriach and stemcell system Gmbh in berlin. Germany had previously introduced cell culture bioreactors. By using this bioreactors solid organs tissues, kidney, liver etc are cultured by stem cells, which laid a path for culturing the skin tissues too. The recent studies related to skin gun assures, the regeneration of skin tissues is very rapid and takes place within few days.
ADVANTAGES

- The time for regeneration of skin tissue reduces to few days by treating the wound with skin gun, when the minimum healing time in primary and secondary burns is about 2-3 weeks.
- This skin gun is well acceptable because the time for wound healing is reduced in addition, it prevent the wound exposure to the dreadful infections.
- Although skin grating method was followed, but still there are chances for infections to occur.
- When we treated with skin gun, fast re-epithelialization of skin is observed. So long time exposure of open wound is prevented, when reduces the side effects.
- Generally the superficial layers of the skin is collected from patient and made into cell suspension so it doesn’t disturb the patient health.
The applications of these cells is very rapid and this gun evenly spreads the skin cells without destroying the natural ones [13].

As the autologous stem cells are collected so the formed skin seems to be very natural, compared to other methods.

Quick recovery is seen, with fully regenerated skin layers like dermis, epidermis and blood vessels. Sometimes the chances for scanning is more.

This advanced regeneration technique which was well explained by skin gun, has shown a future scope for implementing its work on crucial organs like liver, kidney etc [12][13]

DISADVANTAGES

- This skin gun was restricted only to the first and second degree burns only.
- It's effect on the third degree burns are very little.
- It was still under research in Germany on few dozens of patients.
- Sometimes there are chances for infection to occur and stability for newly formed skin is also restricted [13].

PROCEDURE

Initially stamp-sized healthy skin of the injured patient is taken and stem cells were collected from it. Then they are harvested by using suitable enzymes. The prepared cell suspension is injected into sterile syringe and inserted into the gun. This gun helps in uniform spreading of the cells on wound. These cells will migrate, multiple, and differentiate forming a new tissue. The complete process occurs within 2 hr. Full regeneration of skin occurs in 2 weeks and complete formation of texture tools 2-3 months. [6][7]

BIOLOGICAL PROCESS OF TISSUE REPAIRING

When a sudden injury, any abscess or a wound occur. Our body starts its healing mechanism for the protection of the skin. [8]
Wound healing occurs in 3 different phases [9].

The Inflammatory Phase

The Proliferative Phase

The Remodeling phase

Immediately after the injury occurs, the clotting mechanism takes place. The platelets aggregates at site of wound in span of few seconds, helps in preventing the bleeding and also in the repair of skin which reduces the damage of skin.[10]

**The inflammatory phase:** here the White blood cells shows their action. They act as scavengers and get rid of dead cells and their debris. The biochemical signaling helps in the regeneration of new tissues.

**The proliferative phase:** here new skin development takes place at the site of injury. As the time passes the wound disappear. New blood vessels help in healing process. Contraction of muscle cell takes place for the healing of wound. [11]

**The Remodeling phase:** here complete formation of skin is seen which looks very natural and waste cells are destroyed by apoptosis process.

**STAGES INVOLVED**

There are 3 stages involved in wound healing process

**STAGE 1**
RESULTS

By treating with skin gun rapid wound healing is seen within few days than in weeks or months, which reduces the problem that occurs with skin grafting, in which the healing process is very slow. It also helps the patient to prevent the damage occur to other parts of the body [15][16][17].
APPLICATIONS

➢ Till now skin guns is useful in treating the second degree burns along with successfully treating other kinds of skin diseases and skin wounds.
➢ In the first degree burns the presence of the traces of epidermis is seen so the fast recovery of the patient is observed.
➢ In present scenario the skin gun applications are extended in regeneration of lost skin, because of injuries and on pigmentation disorders.
➢ The healing will be effective when the treatment is started immediately after burns.
➢ Patients with infected wounds or with delay in wound healing can go through cell grafting methods.[3]
➢ Patient compliance will be very less compared to the other conventional methods because it is most convenient and comfortable method of treatment.
➢ Research was in progress for treating the complex wounds too. This may overcome all the traditional methods of wound healing.
➢ At present skin gun is generally not used for burn victims with anything less than a second-degree burn either.[12]

CONCLUSION

This technique is well and good for first and second degree burns. During the present time using autologous stem cells was something more ingenious. This technique was emerging now a days which may treat third degree burns in future. But Skin cell gun should overcome few limitations for its establishment in the market. [14][15][16]

REFERENCES


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