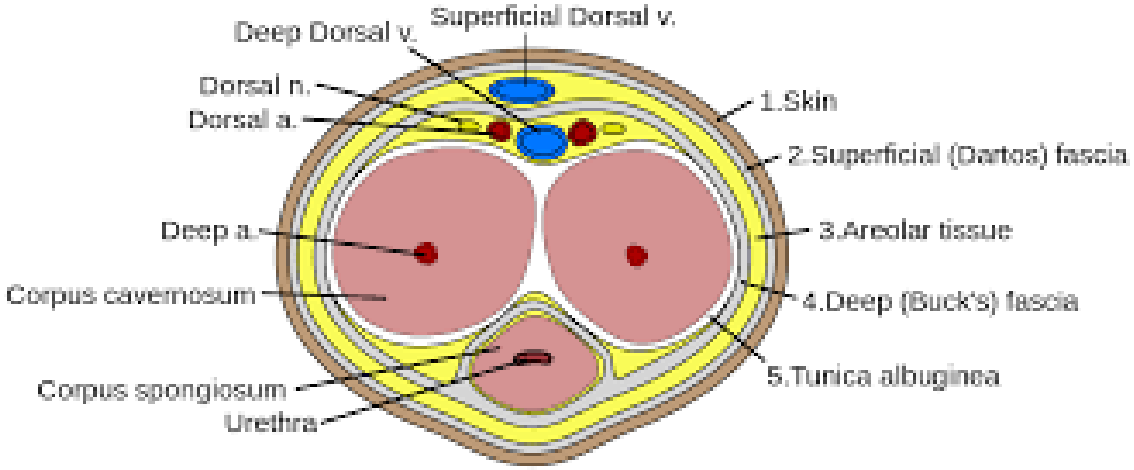
Erectile dysfunction in Diabetics or after Prostate cancer treatment- Overview by J.A. Shehadi, MD 2020

I. **History or Overview:**
   a. Extremely common
   b. The prevalence of erectile dysfunction in diabetes overall was 52.5%
   c. 66.3% prevalence in type II diabetics
   d. 3.5 times more ED than non-diabetic controls

II. **Various types of Treatments used:**
   a. Autologous BMAC
   b. Umbilical cord stem cells
   c. Exosomes
   d. PRP, as a booster

III. **Relevant Anatomy of the Penis:**



a.

IV. **Protocols:**
   a. **15 million umbilical cord stem cells** (Biogenix) injected half to each side of the penis at "10 o'clock and 2 o'clock intracavernosal. Then repeat in one month or two
   b. Alternative is **7.5 billion exosome** injected half into each side of the penis at 10 and 2 o'clock. Then may repeat in one or two months

V. **Outcome scale:**
   a. International index of erectile function-5

VI. **4 References with Abstracts:**

a. **Diabet Med. 2017 Sep;34(9):1185-1192. High prevalence of erectile dysfunction in diabetes: a systematic review and meta-analysis of 145 studies. Kouidrat Y1,2, Pizzol D3, Cosco et al.**

Abstract

Erectile dysfunction may be common among men with diabetes, but its prevalence is still debated. We aimed to assess the relative prevalence of erectile dysfunction in diabetes searching major databases from inception to November 2016 for studies reporting erectile dysfunction in men with Type 1 and Type 2 diabetes mellitus. We conducted a meta-analysis of the prevalence [and 95% confidence intervals (95% CIs)] of erectile dysfunction in diabetes compared with healthy controls, calculating the relative odds ratios (ORs) and 95% CIs. A random effect model was applied. From 3747 initial hits, 145 studies were included representing 88 577 men (age: 55.8 ± 7.9 years). The prevalence of erectile dysfunction in diabetes overall was 52.5% (95% CI, 48.8 to 56.2) after adjusting for publication bias, and 37.5%, 66.3% and 57.7% in Type 1, Type 2 and both types of diabetes, respectively (P for interaction < 0.0001). The prevalence of erectile dysfunction was highest in studies using the Sexual Health Inventory for Men (82.2%, 17 studies, P for interaction < 0.0001). Studies with a higher percentage of people with hypertension moderated our results (beta = 0.03; 95% CI, 0.008 to 0.040; P = 0.003; R2 = 0.00). Compared to healthy controls (n = 5385) men with diabetes (n = 863) were at increased odds of having erectile dysfunction (OR 3.62; 95% CI, 2.53 to 5.16; P < 0.0001; I2 = 67%, k = 8). Erectile dysfunction is common in diabetes, affecting more than half of men with the condition and with a prevalence odds of approximately 3.5 times more than controls. Our findings suggest that screening and appropriate intervention for men with erectile dysfunction is warranted.

b. **Biomed Mater Eng. 2017;28(s1):S81-S85. Stem-cell therapy for erectile dysfunction. Yiou R1.**

Abstract

Stem cell-based therapies have been recently investigated in the field of organic erectile dysfunctions, such as those associated with diabetes or the treatment of prostate cancer. The overall aim is to repair the repair the underlying penile cellular damage. Here, we review the rationale behind the use of stem cells injection in post-radical prostatectomy erectile dysfunction (pRP-ED).Radical prostatectomy for prostate cancer induces complex neurologic and vascular injuries that cause one of the most difficult-to-treat forms of erectile dysfunction. Evidence from animal models replicating pRP-ED suggests that intracavernous injection of autologous bone marrow mononuclear cells (BM-MNCs) may represent the first curative approach. Several clinical trials are ongoing and two of them have been completed with encouraging results.

c. **Treatment of Diabetic Impotence with Umbilical Cord Blood Stem Cell Intracavernosal Transplant: Preliminary Report of 7 Cases. Jong Yoon Bahk,1,5 Jae Hun Jung,1 Hoon Han,2 Seung Ki Min,3 Youn Soo Lee4. Exp Clin Transplant 2010. Jun. (8)2 150-60**

Abstract:

Objectives: Stem cells are characterized by self renewal and multipotent differentiation. We report the effects of intracavernosal transplant of human umbilical cord blood stem cells on diabetic erectile dysfunction.

Materials and Methods: Seven type 2 diabetics who had failed to achieve an erection for at least 6 months despite medications, and who are currently awaiting penile prostheses, participated. All laboratory results were normal, except for impotence and diabetes mellitus. A total of 1.5 × 107 human umbilical cord blood stem cells were infused into the corpus cavernosum. (from **Histostem** a Korean Company) No immunosuppressive measures were taken in any of the patients. International index of erectile function-5, SEP, GAQ, erection diary, blood glucose diary, and medication dosage were followed for 9 months.

Results: The mean age was 69.5 years (range, 57-87 years). Morning erections were regained in 3 participants within 1 month, and for all except 1 by the third month, and maintained for more than 6 months. Rigidity increased as the result of stem cell therapy alone but was insufficient for penetration. With the **addition of PDE5 inhibitor** before coitus, 2 achieved penetration and experienced orgasm, and maintained for more than 6 months; however, 1 participant could not achieved penetration at ninth month. All but 1 reported increased desire. During follow-up, 2 returned for prosthesis, 4 returned to a nonerectile condition at 9 months, and 1 maintained erection sufficient for coitus with medication until the 11th month. Blood glucose levels decreased by 2 weeks, and medication dosages were reduced in all but 1 subject for 4 to 7 months. Glycosylated hemoglobin levels improved after treatment for up to 3 to 4 months.

Conclusions: Human umbilical cord blood stem cell therapy has positive effects on erectile dysfunction and diabetes mellitus. Stem cells and unknown humoral factors of human umbilical cord blood stem cells mediate mechanism may contribute to these positive effects.

d. **Prog Urol. 2018 Feb;28(2):74-84. Treatment by stem cell therapy of erectile dysfunction of diabetic origin: State of the art [Article in French]** R El Osta [1], V Decot [2], D Bensoussan [2], J F Stoltz [2], P Eschwege [3], J Hubert [4]

Abstract

Purpose: Review of various publications on stem cell therapy to treat erectile dysfunction of diabetic origin.

Material and methods: Bibliographic search in PUBMED performed using the keywords cell therapy strain/erectile dysfunction associated with diabetes. Among the 51 articles obtained from the PUBMED research, we selected 16 articles for their specificity of studying erectile dysfunction (DE) related to diabetes.

Results: Different types of stem cells have been studied: adipose derived mesenchymal stem cells/bone marrow derived mesenchymal stem cells as well as progenitor endothelial cells. The experimental protocols are quite

similar from one study to the next with nevertheless some specifications concerning the studied cells and the monitoring of the latter. Intracavernous pressure (ICP) measured after the injection of stem cells into the corpus cavernosum was always significantly higher than the control populations. The addition of certain growth factors to stem cells by gene transfection improve the efficacy of the cells. No ideal tracking markers of the cells have been identified.

Conclusion: The positive effect of the injection of stem cells on the ICP belongs to the cellular trans-differentiation effect but especially to the paracrine effects which have not yet been completely elucidated.