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A Dermatologist's Technique (Injection of Emulsified Adipose Tissue Stromal Vascular Fraction): Can it be Repurposed by Surgeons for the Treatment of Digestive Fistulas?

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Abstract **Review Article**

Background: Digestive fistulas, including esophageal and perianal types, remain a major therapeutic challenge due to their complex anatomy and resistance to conventional treatments. A novel approach adapted from dermatology—endoscopic injection of emulsified adipose tissue stromal vascular fraction (tSVFem)—has shown promise in regenerative medicine. ***Objective:*** This article explores the potential of repurposing a dermatological technique involving autologous tSVFem injections for the minimally invasive treatment of digestive fistulas. ***Methods:*** Recent clinical studies and case series were reviewed to assess the efficacy, safety, and mechanism of action of tSVFem in the treatment of gastrointestinal fistulas. The technique involves mechanical emulsification of adipose tissue to isolate SVF, followed by direct endoscopic injection into the fistulous tract. ***Results:*** In a case series of esophageal fistulas, complete closure was achieved in all patients within one week following tSVFem injection, with no recurrence over eight months. In patients with Crohn's-related perianal fistulas, clinical healing occurred in up to 83% of cases, with durable outcomes observed at three-year follow-up. The regenerative effect is attributed to the anti-inflammatory, angiogenic, and extracellular matrix remodeling properties of the SVF cellular components. ***Conclusion:*** The adaptation of tSVFem injection from dermatology to visceral surgery represents a promising, minimally invasive therapeutic alternative for complex digestive fistulas. Further randomized controlled trials are warranted to validate these early findings and to standardize the procedure for broader clinical use.

Keywords: Emulsified adipose tissue, Stromal vascular fraction (SVF), Digestive fistula, Endoscopic injection, Regenerative medicine, Autologous fat graft, Perianal fistula, Esophageal fistula, Adipose-derived stem cells (ADSCs), Tissue engineering, Minimally invasive surgery, Fistula healing, Translational medicine, Cell therapy.

INTRODUCTION

Digestive fistulas, particularly those associated with Crohn's disease or postoperative complications, present significant therapeutic challenges. Traditional treatments, including surgical interventions and biologic therapies, often yield suboptimal results and carry substantial risks. Recently, a novel approach involving the endoscopic injection of emulsified adipose tissue stromal vascular fraction (tSVFem) has emerged, offering promising outcomes. This technique, initially utilized in dermatology for tissue regeneration, is now being explored by surgeons for managing complex digestive fistulas [1].

Understanding Stromal Vascular Fraction (SVF)

SVF is a heterogeneous cell population derived from adipose tissue, rich in mesenchymal stem cells, endothelial progenitor cells, and immune cells. These components contribute to tissue repair through anti-inflammatory, immunomodulatory, and angiogenic effects. The mechanical emulsification of adipose tissue yields tSVFem, which retains the regenerative properties of SVF without the need for enzymatic digestion or cell culture, making it suitable for clinical applications [1].

Clinical Evidence Supporting tSVFem in Digestive Fistulas

Esophageal Fistulas

A case series published in *Gastroenterology* detailed the successful treatment of esophageal fistulas using endoscopic injection of tSVFem. Five patients with refractory esophageal fistulas underwent the procedure, which involved harvesting autologous adipose tissue, mechanical emulsification to obtain tSVFem, and

endoscopic injection into the fistulous tract. Remarkably, all patients achieved complete fistula closure within seven days, with no reported complications and sustained healing observed over an eight-month follow-up period [1].

Perianal Fistulas in Inflammatory Bowel Disease (IBD)

A pilot study investigated the efficacy of autologous emulsified SVF injections in treating complex perianal fistulas in IBD patients. Ten patients underwent a two-step procedure: initial seton placement followed by curettage, internal fistula closure, and tSVFem injection. Clinical healing was achieved in 83% of cases, with radiological healing observed in 50% at six months. No adverse events were reported, highlighting the safety and potential effectiveness of this approach [2].

Further supporting evidence comes from a three-year follow-up study, where the combined injection of autologous SVF and microfat resulted in a 70% combined remission rate in patients with refractory perianal fistulas due to Crohn's disease. This long-term data underscores the durability of the therapeutic effect [3].

Mechanism of Action

The therapeutic benefits of tSVFem are attributed to its rich cellular composition, which facilitates tissue regeneration through multiple pathways:

- **Anti-inflammatory Effects**: SVF modulates the inflammatory response, reducing chronic inflammation that impedes healing [1].
- **Angiogenesis**: Endothelial progenitor cells promote new blood vessel formation, enhancing tissue perfusion and repair [1].
- **Extracellular Matrix Remodeling**: The presence of matrix metalloproteinases aids in remodeling the extracellular matrix, crucial for tissue regeneration [1].

Advantages Over Traditional Treatments

- **Minimally Invasive**: Endoscopic delivery of tSVFem reduces the need for extensive surgical procedures [1].
  Autologous Source: Utilizing the patient's own adipose tissue minimizes the risk of immune rejection and disease transmission [1].
- **Cost-Effective**: Mechanical emulsification is a straightforward process that avoids the complexities and expenses associated with cell culture [1].

Future Perspectives

While preliminary results are promising, larger randomized controlled trials are necessary to establish standardized protocols, determine long-term efficacy, and identify optimal patient selection criteria. Additionally, exploring the combination of tSVFem with other regenerative therapies, such as platelet-rich plasma, may further enhance treatment outcomes [2][3].

CONCLUSION

The adaptation of tSVFem injections from dermatology to gastrointestinal surgery exemplifies the innovative cross-disciplinary applications of regenerative medicine. This technique offers a safe, effective, and minimally invasive option for treating complex digestive fistulas, potentially transforming current therapeutic strategies [1][2][3].

REFERENCES

1. Nachira D, Trivisonno A, Costamagna G, *et al*. Successful therapy of esophageal fistulas by endoscopic injection of emulsified adipose tissue stromal vascular fraction. *Gastroenterology*. 2021;160(4):1026-1028.
2. Potenza AE, Nachira D, Sacchetti F, Trivisonno A, Pugliese D, Boškoski I, Caudullo G, Minordi LM, Larosa L, Caprino P, Scaldaferri F, Sofo L, Porziella V. Effectiveness of autologous emulsified stromal vascular fraction tissue injection for the treatment of complex perianal fistulas in inflammatory bowel diseases patients: a pilot study. Therap Adv Gastroenterol. 2024 Sep 4;17:17562848241263014. doi: 10.1177/17562848241263014. PMID: 39239070; PMCID: PMC11375657.
3. Guillo L, Grimaud F, Houser F, Prost C, Jouve E, Philandrianos C, Abellan M, Veran J,
4. Visee C, Beyer-Berjot L, Desjeux A, Dignat-George F, Leone M, Grimaud JC, Sabatier F, Serrero M, Magalon J. Three-year outcome of local injection of autologous stromal vascular fraction cells and microfat in refractory perianal fistulas of Crohn's disease. Stem Cell Res Ther. 2022 Feb 9;13(1):67. doi: 10.1186/s13287-022-02738-x. PMID: 35139888; PMCID: PMC8827195.