

Technique for subcutaneous adipose tissue from cranial to the manubrium to produce autologous mesenchymal stem cells and clinical outcomes in 39 dogs

Dr James Guthrie
BVM&S MBA CertAVP(GSAS) PgCertVBM CCRT DipECVS DipACVSMR DipECVSMR FRSB FRSA FRCVS
Fitzpatrick Referrals, Surrey, UK



INTRODUCTION

Adipose tissue has emerged as a valuable source of mesenchymal stem cells for therapeutic applications in veterinary medicine, particularly in the treatment of degenerative joint diseases. Historically, bone marrow has been the primary source of mesenchymal stem cells; however, adipose tissue offers several distinct advantages. Adipose tissue can be harvested in larger volumes with relative ease, the procedure is less invasive and painful for the patient, and it poses lower surgical risks, thereby reducing associated morbidity.^{1,2} Adipose tissue can be collected from various anatomical locations, including the inguinal region, flank, omentum, neck, scapular region, falciform ligament, and others.^{1,3} Among these, falciform fat is frequently used in canine patients due to its consistent presence. However, harvesting adipose tissue from this site requires entry into the abdominal cavity, which carries an increased risk of more severe complications. These risks may include septic peritonitis, herniation, and even organ strangulation, emphasizing the need for careful consideration when selecting a harvest site. A comparative study in dogs⁴ demonstrated no significant difference in the yield of nucleated cells in the stromal vascular fraction (SVF) between adipose tissue collected from the falciform ligament and the flank region. This finding provides clinicians with greater flexibility in choosing a harvest site, allowing for decisions based on the specific clinical scenario and patient considerations. The author of this abstract has been utilising an alternative location for the harvesting of subcutaneous adipose tissue and believes there are advantages to patients and surgeon with this approach.

OBJECTIVE

To report the technique for subcutaneous adipose tissue extraction from cranial to the manubrium to produce autologous mesenchymal stem cells in dogs. Report the advantages and disadvantages of this approach based on the clinical implications and complications encountered.

MATERIALS AND METHODS

Hospital records from April 2021 – April 2024, of patients from one veterinarian, were searched for dogs that met the inclusion criteria. Data recorded included: signalment, reason to use stem cells, complications of adipose-harvest, and any concurrent procedure performed.

RESULTS

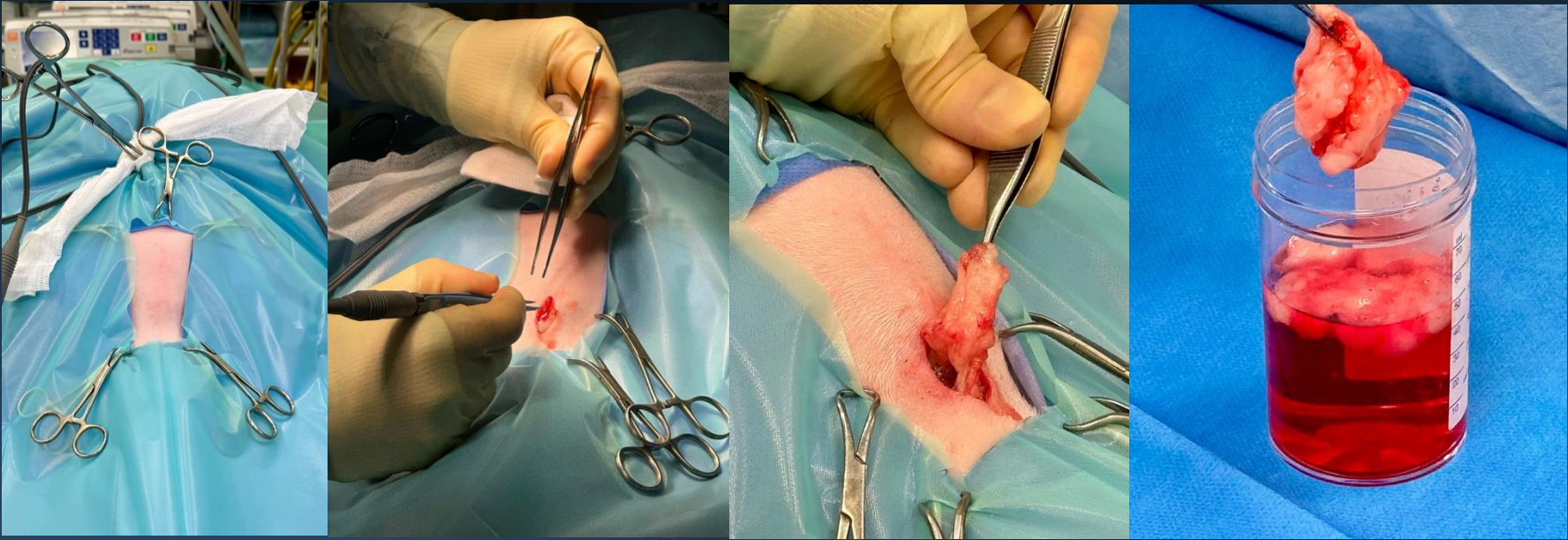
39 dogs met the inclusion criteria. Complications were reported in 3 patients. Two dogs had self-resolving seroma; and one dog had a superficial surgical site infection that required topical antibiotics. Stem cells were used to treat elbow joint arthrosis in 36 patients; stifle arthrosis, hip arthrosis, and hock arthrosis were treated in one patient respectively. Adipose tissue harvest was performed at the time of medial elbow surgery in 30 dogs (27 elbow arthroscopy, 2 sliding humeral osteotomy, 1 canine unicompartmental elbow replacement).

CONCLUSION

Subcutaneous adipose tissue can be harvested from cranial to the manubrium to produce autologous mesenchymal stem cells with minimal complications in dogs and is especially useful for patients concurrently undergoing a medial elbow procedure (such as arthroscopy) as no change in patient positioning is required. Dogs are unable to lick or scratch this region reducing the risk of self-inflicted trauma and making the need to wear an Elizabethan collar obsolete. Additionally, in comparison to the flank region, the surgical scar is hidden improving cosmesis.



Many patients had adipose tissue harvested during elbow arthroscopy. The harvest location cranial to the manubrium is easy to access during elbow arthroscopy when patients are positioned in dorsal recumbency. A one inch incision allowed access for sufficient adipose tissue in all patients.



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