

BRONCHOPLEURAL FISTULA CLOSURE BY AUTOLOGOUS MESENCHYMAL STEM CELL BRONCHOSCOPIC TRANSPLANTATION

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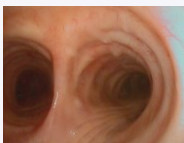


BACKGROUND

- Bronchopleural fistula is a pathological connection between the airway (bronchus) and the pleural space that may develop after lung resection
- Its mortality rate ranges from 12.5 to 71.2%
- The clinical effect of impaired bronchial stump healing after anatomic lung resection may culminate in a life-threatening septic and ventilatory catastrophe
- For many patients with empyema, the presence or absence of a fistula makes the difference between recovery, chronicity or death



BACKGROUND



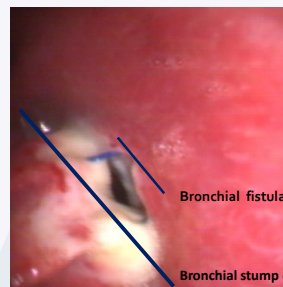
Normal bronchial division



Normal bronchial stump following right pneumonectomy



BACKGROUND



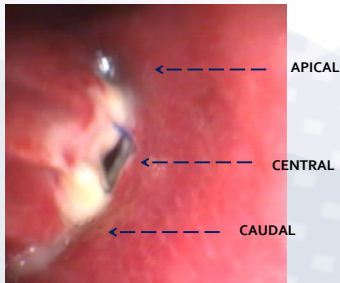
Bronchial fistula in a right main stem bronchus

Bronchial fistula caliber (30%)

Bronchial stump caliber

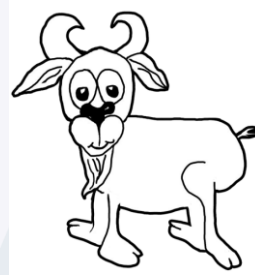


BACKGROUND



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EXPERIMENTAL STUDY DESIGN



18 GOATS (4) : EXPERIMENTAL GROUP (MSC + fibrin glue)

12 GOATS (5): CONTROL GROUP (fibrin glue alone)

GENERAL ANAESTHESIA

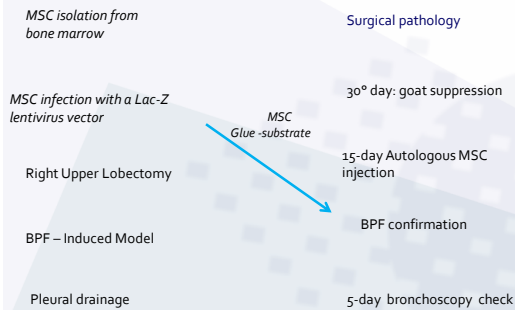
DOUBLE LUMEN VENTILATION

BRONCHIAL STUMP MANUAL SUTURE

VASCULAR LIGATION OR STAPLING

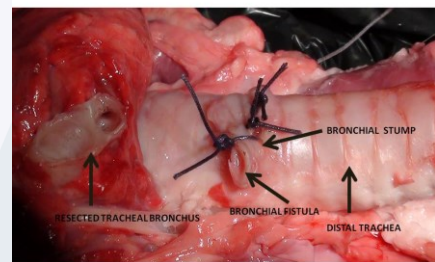
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EXPERIMENTAL STUDY DESIGN



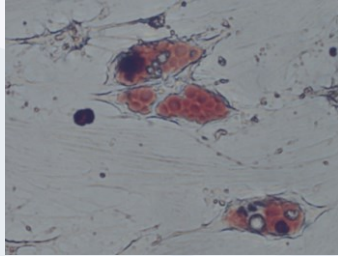
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BPF EXPERIMENTAL MODEL

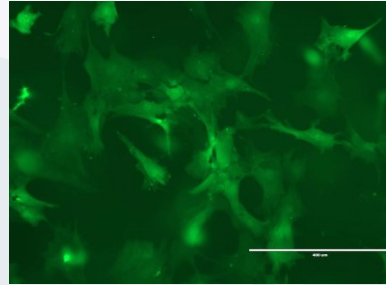


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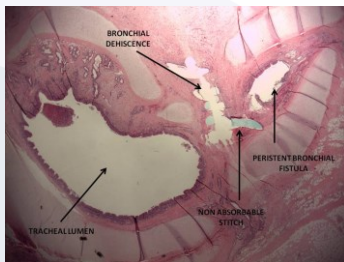
GOAT MSC ADIPOGENIC DIFFERENTIATION



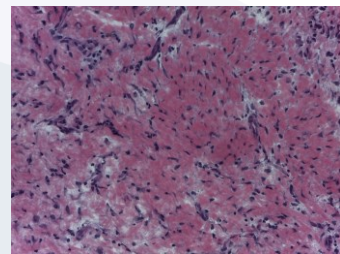
GOAT MSC GROWTH ON MODIFIED GLUE



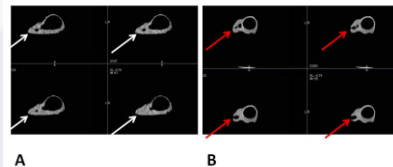
EXPERIMENTAL RESULTS



EXPERIMENTAL RESULTS



EXPERIMENTAL RESULTS



EXPERIMENTAL RESULTS

ORIGINAL THORACIC

Stem Cell Transplantation Effectively Occludes Bronchopleural Fistula in an Animal Model

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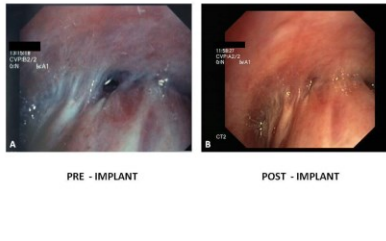
CLINICAL EXPERIENCE - BACKGROUND

- 42-year-old male firefighter suffering from early stage malignant mesothelioma
- Post chemotherapy right extrapleural pneumonectomy
- On post-operative day 18, the patient developed BPF
- Permission from the Ethics Committee
- Notification to the Italian drug agency (AIFA)
- Written informed consent from the patient

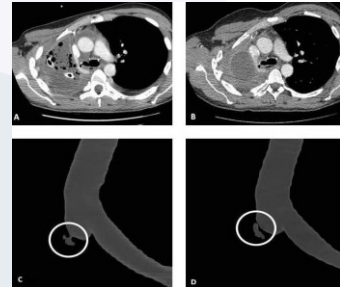
CLINICAL EXPERIENCE - PROCEDURE

- Standard bone marrow aspiration
- Stem cells isolation, expansion and culture (GMP)
- MSC quality controls
- Bronchoscopic implantation
- Post operative care and monitoring
- 6 months clinical, lab and imaging follow up

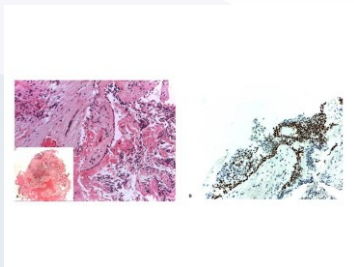
CLINICAL EXPERIENCE - RESULTS



CLINICAL EXPERIENCE - RESULTS



CLINICAL EXPERIENCE - RESULTS



CLINICAL EXPERIENCE

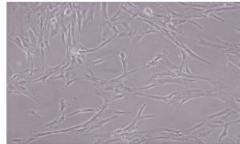


CLINICAL EXPERIENCE

Invited Editorial

Bronchopleural fistula treatment: From the archetype of surgery to the future of stem cell therapy

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CLINICAL EXPERIENCE

Review Article

Current Perspectives in Mesenchymal Stromal Cell Therapies for Airway Tissue Defects

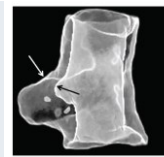
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CLINICAL EXPERIENCE

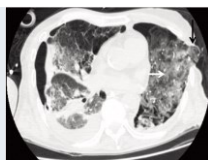
Mini-review

Treatments of post-surgical fistulas with particular emphasis to stem cells therapy

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FUTURE PERSPECTIVES

- Optimization of MSC delivery, homing and engraftment by Platelet Rich Plasma (PRP) gel
- MSC labelling by SPIO or F and tracking by Magnetic Nuclear Resonance
- Phase I Clinical Trial
- Allogenic vs autologous MSC transplantation



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THANK YOU

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