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## Abstract:

**BACKGROUND:** ARDS is a lung disorder that causes death in human and livestock and new therapeutic approaches such as stem cell therapy are essential because of lack of specific drug therapies for it. **OBJECTIVES:** Evaluation of the therapeutic effects of intrapulmonary transplantation of BM-MSCs to improve clinical signs in experimental model of ARDS created by lipopolysaccharide(LPS) *E.Coli* strains-O55:B5 in sheep is the aim of this study. **METHODS:** In this study, 10 male sheep 3-4 months old were used after random placement into two groups, treatment and control. Of sheep in the treatment group, after anesthesia with ketamine and xylazine bone marrow samples were collected and in the clean room BM-MSCs were isolated, amplified and were identified with the evaluation of surface markers. Then experimental model of ARDS was induced by endotracheal injection of LPS at dose of 400 µg/kg. Clinical signs and radiograph images were performed before and 24 hours after injection of LPS. After confirming inflammation, the sheep were anesthetized and on sternal position  $50 \times 10^6$  cells of BM-MSCs third passage were transferred in treatment group as autograft by the catheter lavage in the bifurcation of the trachea and PBS in control group. Then clinical signs were recorded at 3, 6 and 12h and on days 1, 2, 3 and 7 in both groups, and finally were analyzed based on the scored system. **RESULTS:** The data showed transplantation of BM-MSCs caused significant improvement in clinical signs including heart rate, respiratory rate, body temperature, respiratory sounds, cough, mucosal status, nasal secretions, appetite and physical condition compared with control group. A significant decrease in respiratory rate and body temperature from 12 h and in heart rate from 24 h to next was begun. Also, changes in breathing sounds on the first day after transplantation, physical condition, mucous membranes and appetite on the third day, the occurrence of cough and abnormal discharge from the nose on the seventh day had returned to pre-inflammation (-24 time) and the median score was zero for them. **CONCLUSIONS:** This study showed that transplantation of BM-MSCs can improve and cause reduction in the severity of the clinical signs of ARDS, significantly.

**Keyword:** ARDS, BM-MSCs, clinical signs, stem cell therapy, sheep

## Figure Legends and Table Captions

**Table 1.** Conjugated antibodies used in flow cytometry to confirm bone marrow-derived mesenchymal stem cells (BM-MSCs).

**Table 2.** Explain score for clinical signs of acute inflammation of the lungs in sheep.

**Table 3.** Changes in heart rate, respiration rate and rectal temperature of sheep (mean±SD) at various times before and after transplantation of bone marrow-derived mesenchymal stem cells/PBS in groups of treatment and control.

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