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A successful attempt to prevent postoperative adhesions between the mediastinum and a lung: a canine model

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Key words; thoracotomy, adhesion, mediastinum, lung

## Abstract

After right-sided mediastinal pleurectomies, a bioabsorbable sheet was sutured to cover the pleurectomy defect (N=5), whereas not in a control (N=4). There was a significant difference in the mediastinal adhesion between the groups. Our findings suggested the sheet may prevent postoperative adhesions between the mediastinum and a lung.

Previously we reported an anti-adhesive effect of a bioabsorbable sheet between the chest wall and a lung [1].

In this study, we aimed to investigate whether the sheet may prevent adhesions between the mediastinum and a lung in a canine model since postoperative adhesions between those and may affect adversely re-operative pulmonary resections [2].

Seamdura® is a bioabsorbable sheet [1], composed of poly-L-lactide copolymer and  $\epsilon$ -caprolactone, and polyglycolic acid. Nine adult beagle dogs underwent a right thoracotomy and an upper mediastinal pleurectomy (2 cm  $\times$  3 cm) (Figure a). In the experimental (N=5), a 3 cm  $\times$  5 cm sheet was sutured on the pleura with of 4-0 polydioxanone (Figure b) to cover the defect, while not in the control (N=4). At 1 month, mediastinal adhesions were observed in all the control (Figure c) and 1 of the experimental group (p=0.048, by Fisher's exact test). Four of the experimental did not show a mediastinal adhesion (Figure d) with the sheet almost intact and the pleural layer regenerated (Figure e). The procedures were performed in accordance with the "Guide for the Care and Use of Laboratory Animals" published by the National Institutes of Health (NIH Publication No. 85-23, revised 1985).

Our findings suggest the bioabsorbable sheet may prevent mediastinal adhesions with a lung, which

can be challenging a risk factor of conversion of thoracoscopic surgery to open thoracotomy at re-operative procedures [2].

## **References**

[1] Hamaji M, Kojima F, Komatsu T, Tsuruyama T, Date H, Nakamura T. A synthetic bioabsorbable sheet may prevent postoperative intra-pleural adhesions following thoracotomy: a canine model. *Interact Cardiovasc Thorac Surg.* 2014;19:914-20

[2] Hamaji M, Cassivi SD, Shen KR, Allen MS, Nichols FC, Deschamps C, et al. Prior thoracoscopic surgery may improve reoperative pulmonary resection. *Asian Cardiovasc Thorac Ann.* 2013;22:700-705

## **Figure legends**

After a right-sided upper mediastinal pleurectomy (a), the bioabsorbable sheet was sutured on the mediastinal pleura to cover the defect (b) in the experimental group. Adhesions were formed in all the control (c). No adhesion in 4 of the experimental with the mediastinal pleura regenerated macroscopically (d) and microscopically (e, hematoxylin and eosin staining,  $\times 10$ ).

