



Fig. 4. Representative photomicrographs of lung sections (original magnification, $\times 400$) stained with hematoxylin and eosin of the no-treatment (A), surfactant (B), PLV (C), and surfactant + PLV (D) groups. Examination of random fields revealed a generalized reduction in hyaline membrane formation (arrowhead), interstitial edema, and interstitial and intra-alveolar neutrophil (arrow) infiltration when compared with the no-treatment group.

lower in the surfactant group than in the PLV and surfactant + PLV groups ($p < 0.05$).

Histological Analysis

The histological appearance of the lungs was better in the surfactant, PLV, and surfactant + PLV groups (Fig. 4). Examination of random fields under a light microscope revealed a generalized reduction in hyaline membrane formation and alveolar hemorrhage, as well as a reduction in interstitial edema and neutrophil infiltration when compared with the no-treatment group.

DISCUSSION

ARDS is a rather heterogeneous disorder, and no single animal model adequately mimics all facets of the disease.²⁶ One of the authors has reported that intraperitoneal paraquat injection (35 mg/kg) in rats increased wet lung weight, as well as inflammatory responses and total protein in bronchoalveolar lavage fluid, while decreasing lung volumes and alveolar

phospholipids, with maximal effects being found on day 3.⁸ Accordingly, in this study the effects of a surfactant and PLV on gas exchange and lung histology were examined 3 days after paraquat injection in this animal model of lung injury.

PLV has been shown to improve lung mechanics, gas exchange, and survival in premature animals with RDS and acute lung injury induced by saline lavage and acid infusion.^{10,11,15,16,18,19} In this study, we evaluated the effects of a surfactant and PLV with FC-77 on gas exchange and lung histology in a rat model of paraquat-induced lung injury. We found that oxygenation improved after administration of either the surfactant or FC-77. However, oxygenation improved transiently in the PLV group and deteriorated after the administration of FC-77 in the surfactant + PLV group. Furthermore, improvement in oxygenation with FC-77 was much less dramatic than in previous studies with PLV combined with perflubron.^{15,19}

Previous studies on the interactions between PFC and an exogenous surfactant revealed conflicting results.²⁰⁻²³ Mrozek et al. found that a protein-containing surfactant administered before perflubron improved