

INTRODUCTION

Fat embolism (FE) can result in both acute and chronic lung injury, inflammation and fibrosis in particular (1). A rat model of Triolein (T)-induced FE demonstrated that the histopathological damage was present not only in the lungs, but also the heart and kidneys. Our previous studies suggested that the Renin-Angiotensin System (RAS) plays a role in the pathogenesis of fibrosis (2). We demonstrated that losartan (an angiotensin II receptor blocker) was protective against FE-induced damage in both the lungs and heart at 10 weeks (3). Additionally, at 48 hours significant damage was already evident in the lungs, and was prevented by aliskiren (a direct renin inhibitor) (4). In this study, we examined the acute effects of FE (48 hours) on the heart, and the impact of aliskiren on this organ compared to its protective effect on the lungs.

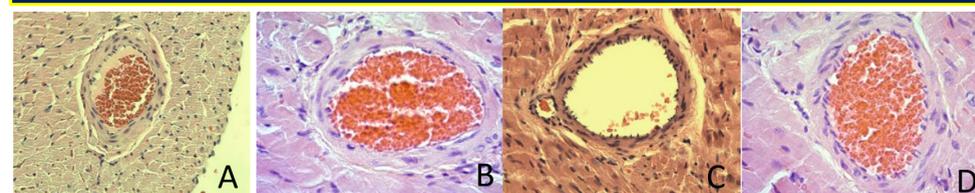
METHODS

Twenty-two rats were divided into controls (n = 4, group A) and three FE groups (n = 6, groups B, C & D). FE induction was done with Triolein 0.2 mL IV at 0 hours, and 1 hour later the animals received 0.2 mL IP saline (groups A & B), aliskiren at 50 mg/kg (group C) or aliskiren at 100 mg/kg (group D). Rats were euthanized at 48 hours and hearts fixed and stained with H&E for histological studies (vasculitis and lumen patency measurements, in particular), Masson's Trichrome (MT) for collagen, and alpha-smooth muscle actin (SMA) for myofibroblasts. Two pathologists unaware of the slides' identity evaluated the heart damage and took 10 photographs of each slide at 400x.

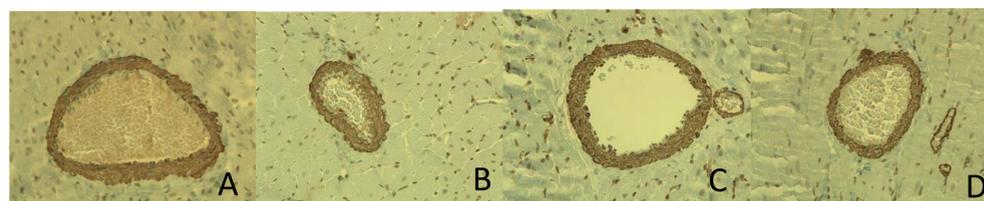
RESULTS

Rats in the FE-only group (group B) had a higher percentage of SMA staining around the branches of the coronary arteries compared to the control group (A) (p < 0.05). There were no significant differences in lumen patency, media-adventitia ratios and MT staining among the 4 groups. Aliskiren at both doses (C & D) did not show a significant effect on SMA staining compared to FE only (B). In contrast, aliskiren at both doses showed reduction in SMA and MT staining in the lungs. (5)

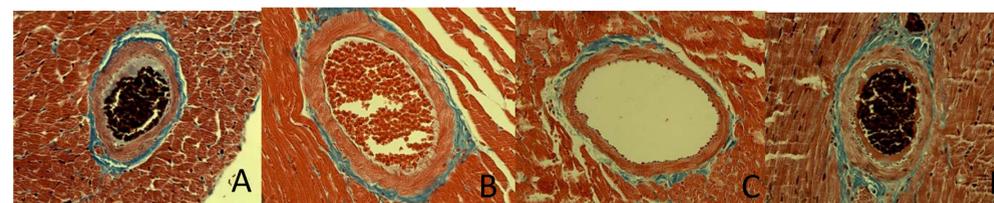
SUMMARY



Stain: H&E, 400x

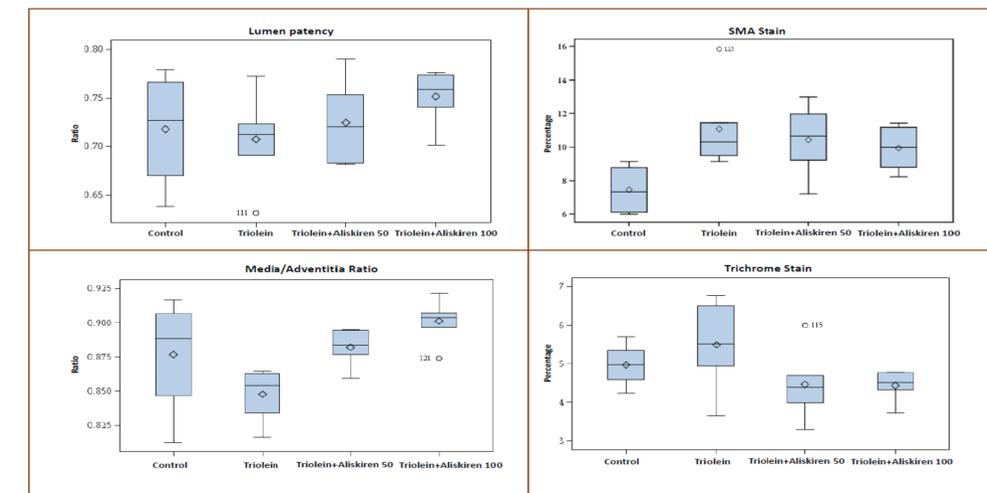


Stain: Smooth Muscle Actin, 400x



Stain: Trichrome, 400x

Figure 1 – representative slides of myocardial sections with a coronary artery of A.) saline + saline B.) Triolein + saline C.) Triolein + aliskiren 50 mg D.) Triolein + aliskiren 100 mg.



CONCLUSION

Animals subjected to FE sustained acute injury (48 hours) of both the heart and the lungs, with less prominent changes in the heart. While aliskiren significantly reduced the fibrotic damage in the lungs, such an effect was not seen in the hearts of these same animals. This is in contrast to the delayed effects of FE at 10 weeks, when there was a similar extent of damage to both organs and protection by angiotensin II receptor blocker losartan. These varying results suggest different pathophysiological processes in the evolution of inflammation and fibrosis in the two organs.

CREDITS/DISCLOSURE/REFERENCES

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