PURPOSE

Previous studies of collagen content in failing human hearts have been small-scale and have lacked non-failing/normal controls.

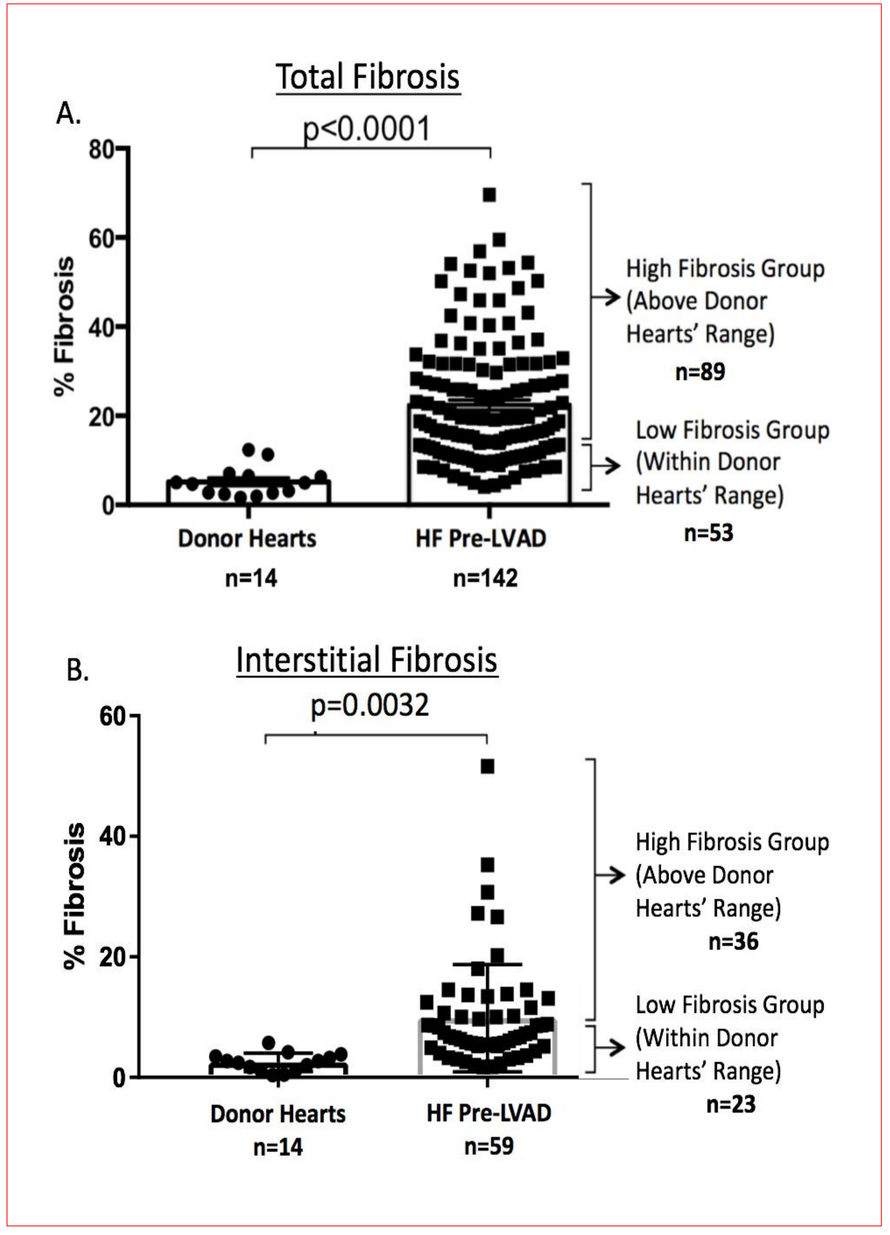
METHODS

We prospectively evaluated **142 advanced HF patients** with chronic and dilated cardiomyopathy who required LVAD circulatory support (excluding acute HF patients) and **14 normal donors** (ND) whose hearts were not allocated for transplantation for non-cardiac reasons. Full thickness tissue samples were obtained from the LV apex during device implant. Fibrosis was evaluated using Masson's Trichrome stain and previously validated digital histopathological techniques. The following parameters were then determined:

Parameters we evaluated

- Total fibrosis – Full thickness (endocardium to epicardium) collagen content; prospectively excluding infarct-related scar.
- Perivascular fibrosis – Collagen immediately surrounding vessels ≥ 60μm in diameter.
- Interstitial fibrosis – Total fibrosis minus perivascular fibrosis.

RESULTS



A surprisingly large number (37%) of end-stage failing human hearts had fibrosis levels within the ND range (Panel A). Likewise, for interstitial fibrosis, 39% (n=23) of the failing human hearts had extracellular interstitial fibrosis within the range of the NDs (Panel B). Age, gender and other baseline characteristics were similar between the High and Low fibrosis patient subgroups.

Total and interstitial fibrosis parameters of advanced heart failure patients (HF group) vs non-failing donor control hearts (ND Group)

	HF Group (n=142)	ND Group (n=14)
Total Fibrosis (%)	22.4	9.4
Total Fibrosis (Range)	4.1– 69.5	1.7 - 12.6
Interstitial Fibrosis (%)	9.8	1.9
Interstitial Fibrosis (Range)	1.7 – 51.6	0.4– 5.7

CONCLUSION

- In this large-scale human study, advanced HF patients had significant variation in the degree of both total and interstitial fibrosis in their extracellular matrix.
- Many of these failing hearts had very low fibrosis, similar to levels found in non-failing hearts.
- Further investigation of the pathophysiological mechanisms and clinical impact of these findings is warranted.