Perfusion scintigraphy and patient selection for lung volume reduction surgery

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Online data suppliment

Major enrollment criteria were:

1. Bilateral emphysema with $FEV_1 \leq 45\%$ predicted
2. Total lung capacity $\geq 100\%$ predicted
3. Residual volume $\geq 150\%$ predicted
4. $PaCO_2 \leq 60$ mm Hg ($PaCO_2 \leq 55$ mm Hg in Denver, CO).

Supplementary figures

Figure E1. Kaplan-Meier survival curves after randomization for patients with non-upper lobe predominant emphysema (n = 357). Among those with low exercise capacity (panel A1) mortality was similar with LVRS or optimal medical management (RR = 0.78, p = 0.18). This did not change after classifying patients as having low or high upper-zone perfusion (panel A2, RR = 0.88, p = 0.38, and panel A3, RR = 0.76, p = 0.21, respectively). Among those with high exercise capacity (panel B1) survival was also similar with LVRS and optimal medical management (RR = 1.2, p = 0.20). This did not change after classifying patients as having low or high upper-zone perfusion (panel B2, RR = 1.8, p = 0.33, and panel B3, RR = 1.1, p = 0.35, respectively).

Figure E2. A comparison of frequency of improvement in functional outcomes after randomization to lung volume reduction surgery (LVRS, black bars) vs. optimal medical treatment (OMT, grey bars) for patients with non-upper lobe predominant emphysema and low exercise capacity at baseline. Outcomes were mostly better with LVRS though these improvements did not persist till 3 years after randomization (column C1). This remained true after patients were classified as having low (column C2) or high upper-zone perfusion (column C3). The sample size was smaller in the low compared to the high perfusion group (39 vs. 100) which likely resulted in the non-significant p-values at 1 year follow-up in those with low perfusion.

Figure E3. A comparison of frequency of improvement in functional outcomes after randomization to lung volume reduction surgery (LVRS, black bars) vs. optimal medical treatment (OMT, grey bars) for patients with non-upper lobe predominant emphysema and high exercise capacity at baseline. Outcomes were mostly better with LVRS though improvements did not persist 3 years after randomization (column D1). This remained true after patients were classified as having low (column D2) or high upper-zone perfusion (column D3). The sample size was smaller in the low compared to the high perfusion group (34 vs. 96) which likely resulted in the non-significant p-values at 1 year follow-up in those with low perfusion.

Figure E4. A comparison of different cutoffs for defining low vs. high upper-zone perfusion. 20% appeared to be the best cut-off because the odds ratio started to approach one when the cutoff was increased or decreased

from 20%. The cutoff of 20% also resulted in the narrowest confidence interval for the odds ratio. Note: x-axis is not to scale.

Figure E1.

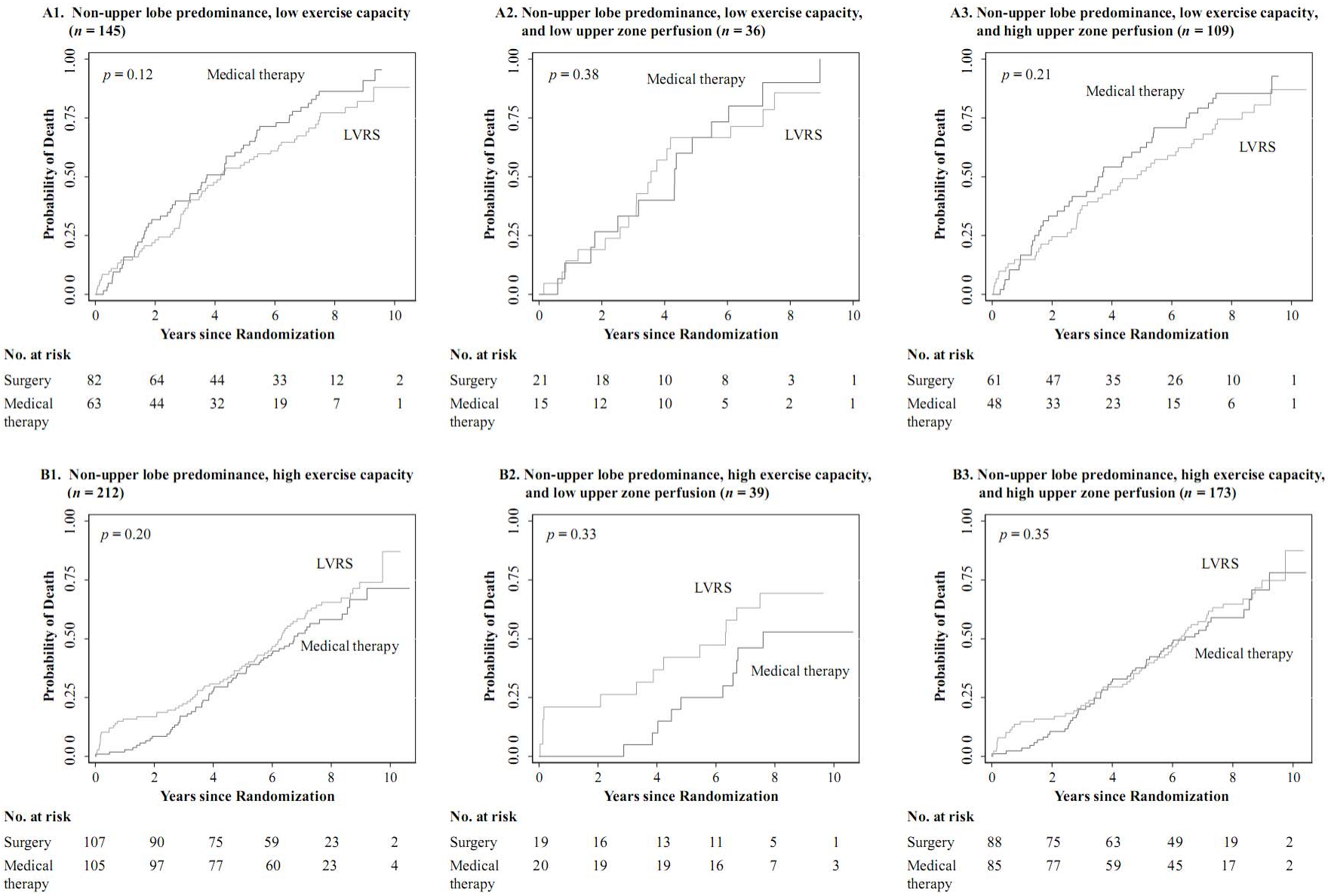
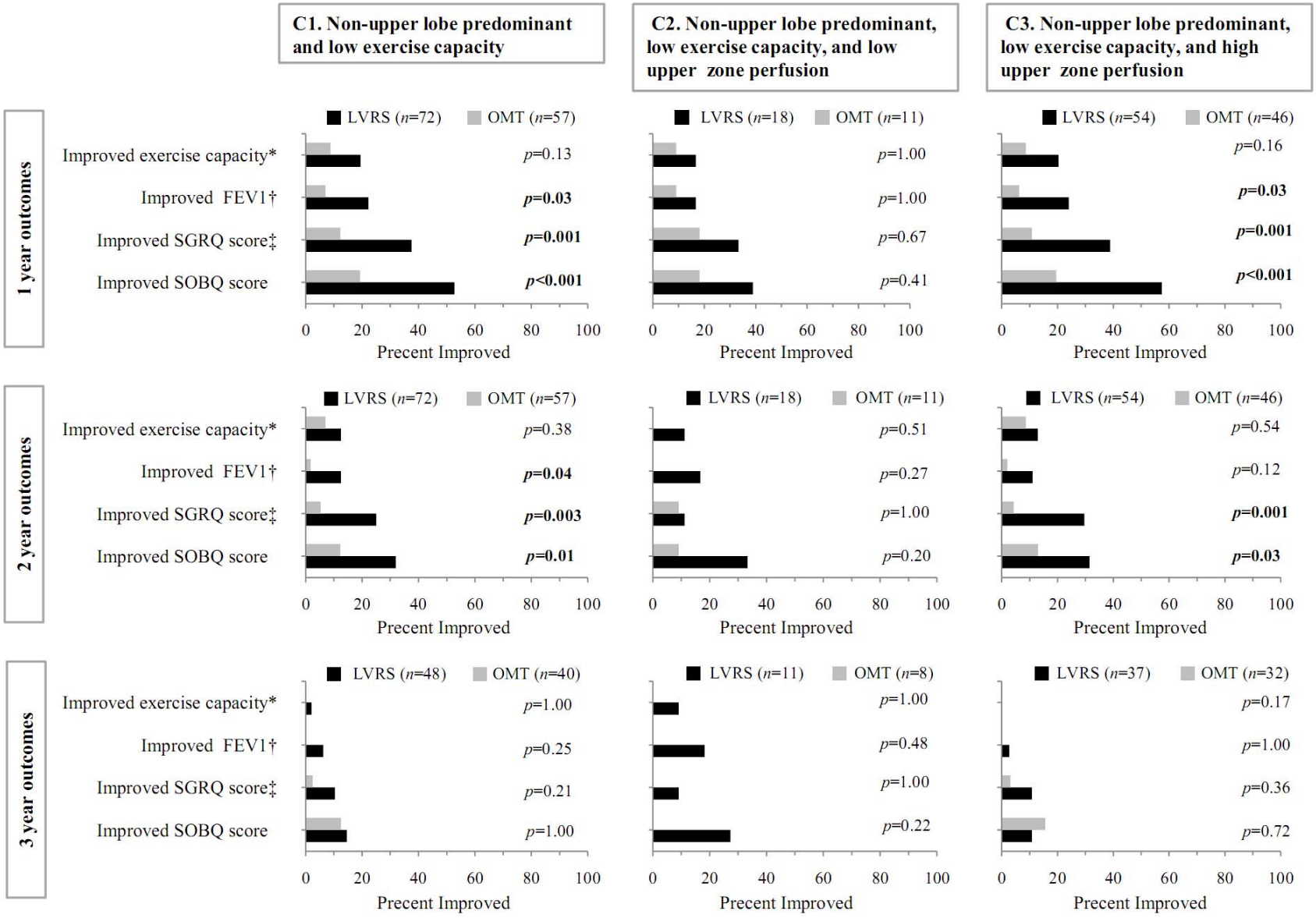


Figure E2.



* ≥ 10 Watt improvement in exercise capacity; † ≥ 100 mL improvement in FEV_1; ‡ ≥ 8 point improvement in total SGRQ score; § ≥ 5 point improvement in SOBQ score from baseline.

Figure E3.

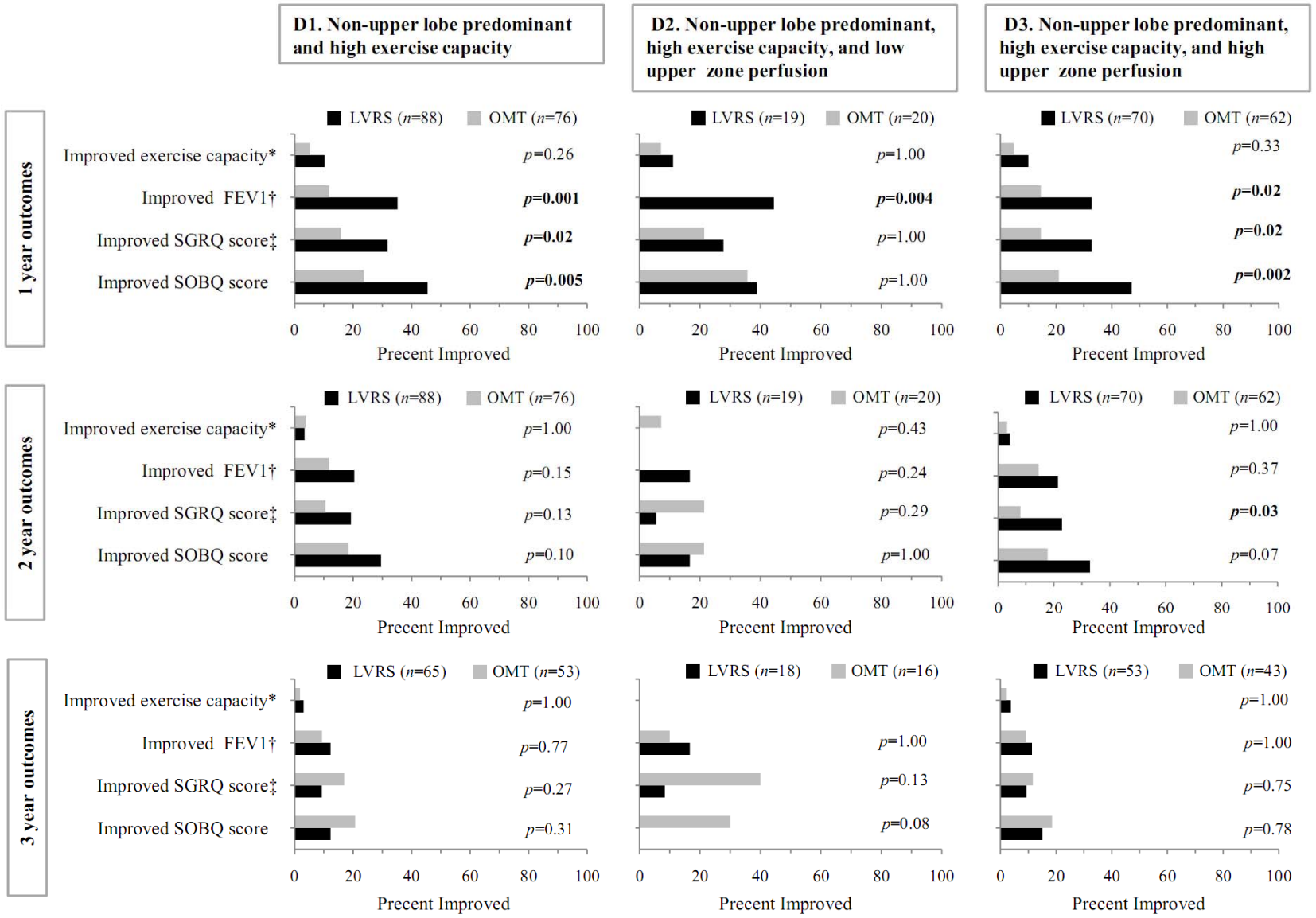


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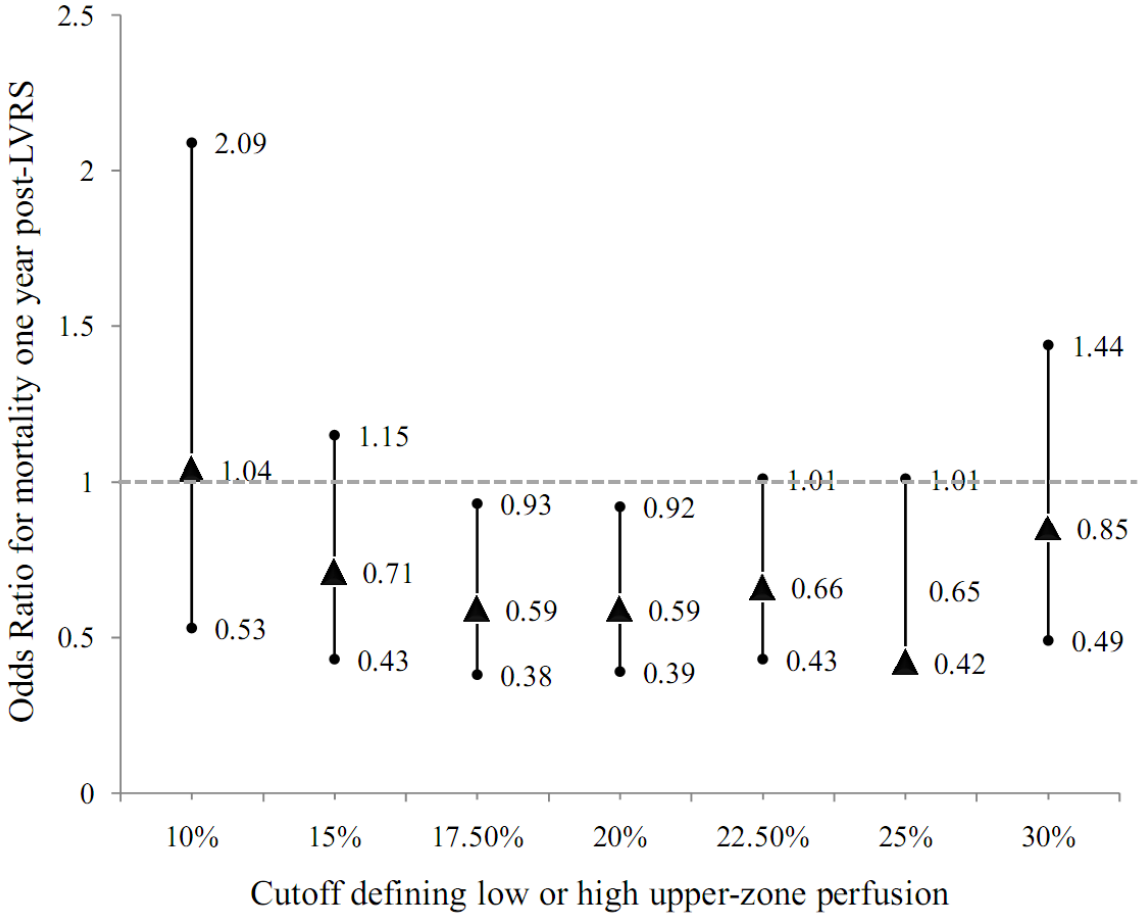
Figure E4.


Odds Ratio for mortality one year post-LVRS
2.5
2
1.5
1
0.5
0
2.09
1.04
0.53
1.15
0.71
0.43
0.93
0.59
0.38
0.92
0.59
0.39
1.01
0.66
0.43
1.01
0.65
0.42
1.44
0.85
0.49
10%
15%
17.50%
20%
22.50%
25%
30%
Cutoff defining low or high upper-zone perfusion