**Supplemental Materials**

**Survey instrument:**

**Mitral Valve**

1. Can you adequately visualize the mitral valve (MV)?
a. Yes

b. No

**MV Doppler section**

1. Do you see any MV regurgitation?
2. Yes
3. No
4. Can't identify
5. Is the MV regurgitation Pan-systolic?
6. Yes
7. No
8. Can't identify
9. What is the length of regurgitation jet?
10. < 1 cm

b. 1-1.5 cm

c. 1.5-2 cm

 d. >2 cm

e. Can’t identify

1. Is the regurgitation jet eccentric?
2. Yes
3. No
4. Can't Identify
5. Is the mitral jet multi-colored?
6. Yes
7. No
8. Can't Identify

**MV Soft tissue section**

1. Do you see MV anterior leaflet thickening (>3mm)?
2. Yes
3. No
4. Can't Identify
5. Do you see MV chordal thickening?
6. Yes
7. No
8. Can't Identify
9. Do you see any restriction of the mitral valve during diasotole?
10. Yes
11. No
12. Can't identify
13. Is there any overlap/override of the anterior leaflet of the mitral valve on the posterior leaflet during systole (ie improper coaptation)?
14. Yes
15. No
16. Can't Identify

**Aortic Valve**

1. Can you adequately visualize the aortic valve (AV)?
2. Yes
3. No

**AV Doppler section**

1. Do you see any AV regurgitation?
2. Yes
3. No
4. Can't Identify

**AV Soft tissue section**

1. Do you see any irregular or focal thickening of the aortic valve?
2. Yes
3. No
4. Can't Identify
5. Is there any restriction in aortic valve motion?
6. Yes
7. No
8. Can't Identify
9. Does the aortic valve have normal coaptation?
10. Yes
11. No
12. Can't Identify
13. Is the coaptation of the AV asymmetric?
14. Yes
15. No

**Screen Status**

1. Is this study screen positive?
2. Yes
3. No

**Supplemental Table 1:** Comparison of mitral valve and aortic valve abnormalities by ultrasound device for screen negative ultrasounds by expert review.

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Lumify device (N=11)** | **M-Turbo device (N=11)** | **P-value** |
| Adequately visualize the MV, n (%) |   |   | N.E. |
|  Yes |  11 (100.0%)  |  11 (100.0%)  |
|  No |  0 (0.0%)  |  0 (0.0%)  |
| Any MV regurgitation, n (%) |   |   | 0.025 |
|  Yes |  4 (36.4%)  |  9 (81.8%)  |
|  No |  7 (63.6%)  |  2 (18.2%)  |
| Pan-systolic MV regurgitation, n (%) |   |   | N.E. |
|  Number missing |  7  |  3  |
|  Yes |  0 (0.0%)  |  1 (12.5%)  |
|  No |  4 (100.0%)  |  7 (87.5%)  |
| Length of MV regurgitation jet, n (%) |   |   | 0.564 |
|  Number missing |  7  |  2  |
|  < 1 cm |  3 (75.0%)  |  5 (55.6%)  |
|  1-1.5 cm |  1 (25.0%)  |  4 (44.4%)  |
| Eccentric regurgitation jet, n (%) |   |   | >0.999 |
|  Number missing |  7  |  2  |
|  Yes |  1 (25.0%)  |  3 (33.3%)  |
|  No |  3 (75.0%)  |  6 (66.7%)  |
| Multi-colored mitral jet, n (%) |   |   | 0.317 |
|  Number missing |  7  |  2  |
|  Yes |  1 (25.0%)  |  5 (55.6%)  |
|  No |  3 (75.0%)  |  4 (44.4%)  |
| MV anterior leaflet thickening (>3mm), n (%) |   |   | N.E. |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  11 (100.0%)  |  11 (100.0%)  |
| MV chordal thickening, n (%) |   |   | N.E. |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  11 (100.0%)  |  11 (100.0%)  |
| Any restriction of the MV during diastole, n (%)  |   |   | N.E. |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  11 (100.0%)  |  11 (100.0%)  |
| Any overlap/override of the anterior leaflet of the MV on the posterior leaflet during systole, n (%) |   |   | N.E. |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  11 (100.0%)  |  11 (100.0%)  |
| Adequate visualization of the AV, n (%) |   |   | N.E. |
|  Yes |  11 (100.0%)  |  10 (90.9%)  |
|  No |  0 (0.0%)  |  1 (9.1%)  |
| Any AV regurgitation, n (%)  |   |   | N.E. |
|  Number missing |  0  |  1  |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  11 (100.0%)  |  10 (100.0%)  |
| Any irregular or focal thickening of the AV, n (%) |   |   | N.E. |
|  Number missing |  0  |  1  |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  11 (100.0%)  |  10 (100.0%)  |
| Any restriction in AV motion, n (%) |   |   | N.E. |
|  Number missing |  0 |  1 |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  11 (100.0%)  |  10 (100.0%)  |
| Normal coaptation of the AV, n (%) |   |   | N.E. |
|  Number missing |  0  |  1  |
|  Yes |  11 (100.0%)  |  10 (100.0%)  |
|  No |  0 (0.0%)  |  0 (0.0%)  |

1P-value is for McNemar’s test for paired samples.

2N.E. means not estimable.

**Supplemental Table 2:** Comparison of mitral valve and aortic valve abnormalities by ultrasound device for negative agreements for non-expert review.

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Lumify device (N=14)** | **M-Turbo device (N=14)** | **P-Value** |
| Adequately visualize the MV, n (%) |   |   | N.E. |
|  Yes |  14 (100.0%)  |  14 (100.0%)  |
|  No |  0 (0.0%)  |  0 (0.0%)  |
| Any MV regurgitation, n (%) |   |   | 0.180 |
|  Yes |  4 (28.6%)  |  7 (50.0%)  |
|  No |  10 (71.4%)  |  7 (50.0%)  |
| Pan-systolic MV regurgitation, n (%) |   |   | N.E. |
|  Number missing |  10  |  7  |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  4 (100.0%)  |  7 (100.0%)  |
| Length of MV regurgitation jet, n (%) |   |   | 0.317 |
|  Number missing |  10  |  7  |
|  <1 cm |  3 (75.0%)  |  5 (71.4%)  |
|  1-1.5 cm |  1 (25.0%)  |  2 (28.6%)  |
| Eccentric regurgitation jet, n (%) |   |   | N.E. |
|  Number missing |  10  |  7  |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  4 (100.0%)  |  7 (100.0%)  |
| Multi-colored mitral jet, n (%) |   |   | N.E. |
|  Number missing |  10  |  7  |
|  Yes |  1 (25.0%)  |  2 (28.6%)  |
|  No |  3 (75.0%)  |  5 (71.4%)  |
| MV anterior leaflet thickening (>3mm), n (%) |   |   | N.E. |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  14 (100.0%)  |  14 (100.0%)  |
| MV chordal thickening, n (%) |   |   | N.E. |
|  Number missing |  0  |  1  |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  14 (100.0%)  |  13 (100.0%)  |
| Any restriction of the MV during diastole, n (%)  |   |   | N.E. |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  14 (100.0%)  |  14 (100.0%)  |
| Any overlap/override of the anterior leaflet of the MV on the posterior leaflet during systole, n (%) |   |   | N.E. |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  14 (100.0%)  |  14 (100.0%)  |
| Adequate visualization of the AV, n (%) |   |   | N.E. |
|  Yes |  14 (100.0%)  |  14 (100.0%)  |
|  No |  0 (0.0%)  |  0 (0.0%)  |
| Any AV regurgitation, n (%)  |   |   | N.E. |
|  Number missing |  0  |  5  |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  14 (100.0%)  |  9 (100.0%)  |
| Any irregular or focal thickening of the AV, n (%) |   |   | N.E. |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  14 (100.0%)  |  14 (100.0%)  |
| Any restriction in AV motion, n (%) |   |   | N.E. |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  14 (100.0%)  |  14 (100.0%)  |
| Normal coaptation of the AV, n (%) |   |   | N.E. |
|  Yes |  14 (100.0%)  |  14 (100.0%)  |
|  No |  0 (0.0%)  |  0 (0.0%)  |

1P-value is for McNemar’s test for paired samples.

2N.E. means not estimable.

**Supplemental Table 3:** Disagreements between devices for expert review

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Lumify device (N=3)** | **M-Turbo device (N=3)** | **P-value** |
| Adequately visualize the MV, n (%) |   |   | N.E. |
|  Yes |  3 (100.0%)  |  3 (100.0%)  |
|  No |  0 (0.0%)  |  0 (0.0%)  |
| Any MV regurgitation, n (%) |   |   | N.E. |
|  Yes |  1 (33.3%)  |  3 (100.0%)  |
|  No |  2 (66.7%)  |  0 (0.0%)  |
| Pan-systolic MV regurgitation, n (%) |   |   | N.E. |
|  Number missing |  2  |  0  |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  1 (100.0%)  |  3 (100.0%)  |
| Length of MV regurgitation jet, n (%) |   |   | N.E. |
|  Number missing |  2  |  0  |
|  < 1 cm |  1 (100.0%)  |  3 (100.0%)  |
| Eccentric regurgitation jet, n (%) |   |   | N.E. |
|  Number missing |  2  |  0  |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  1 (100.0%)  |  3 (100.0%)  |
| Multi-colored mitral jet, n (%) |   |   | N.E. |
|  Number missing |  2  |  0  |
|  Yes |  1 (100.0%)  |  0 (0.0%)  |
|  No |  0 (0.0%)  |  3 (100.0%)  |
| MV anterior leaflet thickening (>3mm), n (%) |   |   | N.E. |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  3 (100.0%)  |  3 (100.0%)  |
| MV chordal thickening, n (%) |   |   | N.E. |
|  Yes |  0 (0.0%)  |  1 (33.3%)  |
|  No |  3 (100.0%)  |  2 (66.7%)  |
| Any restriction of the MV during diastole, n (%)  |   |   | N.E. |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  3 (100.0%)  |  3 (100.0%)  |
| Any overlap/override of the anterior leaflet of the MV on the posterior leaflet during systole, n (%) |   |   | N.E. |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  3 (100.0%)  |  3 (100.0%)  |
| Adequate visualization of the AV, n (%) |   |   | N.E. |
|  Yes |  3 (100.0%)  |  3 (100.0%)  |
|  No |  0 (0.0%)  |  0 (0.0%)  |
| Any AV regurgitation, n (%)  |   |   | N.E. |
|  Number missing |  0  |  1  |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  3 (100.0%)  |  2 (100.0%)  |
| Any irregular or focal thickening of the AV, n (%) |   |   | 0.564 |
|  Yes |  2 (66.7%)  |  1 (33.3%)  |
|  No |  1 (33.3%)  |  2 (66.7%)  |
| Any restriction in AV motion, n (%) |   |   | N.E. |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  3 (100.0%)  |  3 (100.0%)  |
| Normal coaptation of the AV, n (%) |   |   | N.E. |
|  Yes |  3 (100.0%)  |  3 (100.0%)  |
|  No |  0 (0.0%)  |  0 (0.0%)  |

1P-value is for McNemar’s test for paired samples.

2N.E. means not estimable.

**Supplemental Table 4:** Disagreements between devices for non-expert review

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Lumify device (N=3)** | **M-Turbo device (N=3)** | **P-value** |
| Adequately visualize the MV, n (%) |   |   | N.E. |
|  Yes |  3 (100.0%)  |  3 (100.0%)  |  |
|  No |  0 (0.0%)  |  0 (0.0%)  |  |
| Any MV regurgitation, n (%) |   |   | N.E. |
|  Yes |  3 (100.0%)  |  3 (100.0%)  |  |
|  No |  0 (0.0%)  |  0 (0.0%)  |  |
| Pan-systolic MV regurgitation, n (%) |   |   | N.E. |
|  Yes |  0 (0.0%)  |  3 (100.0%)  |  |
|  No |  3 (100.0%)  |  0 (0.0%)  |  |
| Length of MV regurgitation jet, n (%) |   |   |  |
|  <1 cm |  1 (33.3%)  |  0 (0.0%)  | N.E. |
|  1-1.5 cm |  1 (33.3%)  |  0 (0.0%)  |  |
|  1.5-2 cm |  1 (33.3%)  |  2 (66.7%)  |  |
|  >2 cm |  0 (0.0%)  |  1 (33.3%)  | N.E. |
| Eccentric regurgitation jet, n (%) |   |   |  |
|  Yes |  0 (0.0%)  |  3 (100.0%)  |  |
|  No |  3 (100.0%)  |  0 (0.0%)  |  |
| Multi-colored mitral jet, n (%) |   |   | N.E. |
|  Yes |  1 (33.3%)  |  3 (100.0%)  |  |
|  No |  2 (66.7%)  |  0 (0.0%)  |  |
| MV anterior leaflet thickening (>3mm), n (%) |   |   |  |
|  Yes |  0 (0.0%)  |  0 (0.0%)  | N.E. |
|  No |  3 (100.0%)  |  3 (100.0%)  |  |
| MV chordal thickening, n (%) |   |   |  |
|  Yes |  0 (0.0%)  |  0 (0.0%)  | N.E. |
|  No |  3 (100.0%)  |  3 (100.0%)  |  |
| Any restriction of the MV during diastole, n (%)  |   |   |  |
|  Yes |  0 (0.0%)  |  0 (0.0%)  | N.E. |
|  No |  3 (100.0%)  |  3 (100.0%)  |  |
| Any overlap/override of the anterior leaflet of the MV on the posterior leaflet during systole, n (%) |   |   |  |
|  Yes |  0 (0.0%)  |  1 (33.3%)  | N.E. |
|  No |  3 (100.0%)  |  2 (66.7%)  |  |
| Adequate visualization of the AV, n (%) |   |   |  |
|  Yes |  3 (100.0%)  |  3 (100.0%)  | N.E. |
|  No |  0 (0.0%)  |  0 (0.0%)  |  |
| Any AV regurgitation, n (%)  |   |   |  |
|  Number missing |  0  |  1  | N.E. |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |  |
|  No |  3 (100.0%)  |  2 (100.0%)  |  |
| Any irregular or focal thickening of the AV, n (%) |   |   |  |
|  Yes |  0 (0.0%)  |  0 (0.0%)  | 0.564 |
|  No |  3 (100.0%)  |  3 (100.0%)  |  |
| Any restriction in AV motion, n (%) |   |   |  |
|  Yes |  0 (0.0%)  |  0 (0.0%)  | N.E. |
|  No |  3 (100.0%)  |  3 (100.0%)  |  |
| Normal coaptation of the AV, n (%) |   |   |  |
|  Yes |  3 (100.0%)  |  3 (100.0%)  | N.E. |
|  No |  0 (0.0%)  |  0 (0.0%)  |  |
|  |  |  |  |

1P-value is for McNemar’s test for paired samples.

2N.E. means not estimable.

**Supplemental Table 5\*:** Comparison of mitral valve and aortic valve abnormalities by ultrasound device for positive agreements for non-expert review

|  |  |  |
| --- | --- | --- |
| **Variable** | **Lumify device (N=2)** | **M-Turbo device (N=2)** |
| Adequately visualize the MV, n (%) |   |   |
|  Yes |  2 (100.0%)  |  2 (100.0%)  |
|  No |  0 (0.0%)  |  0 (0.0%)  |
| Any MV regurgitation, n (%) |   |   |
|  Yes |  1 (50.0%)  |  1 (50.0%)  |
|  No |  1 (50.0%)  |  1 (50.0%)  |
| Pan-systolic MV regurgitation, n (%) |   |   |
|  Number missing |  1  |  1  |
|  Yes |  1 (100.0%)  |  1 (100.0%)  |
|  No |  0 (0.0%)  |  0 (0.0%)  |
| Length of MV regurgitation jet, n (%) |   |   |
|  Number missing |  1  |  1  |
|  >2 cm |  1 (100.0%)  |  1 (100.0%)  |
| Eccentric regurgitation jet, n (%) |   |   |
|  Number missing |  1  |  1  |
|  Yes |  1 (100.0%)  |  1 (100.0%)  |
|  No |  0 (0.0%)  |  0 (0.0%)  |
| Multi-colored mitral jet, n (%) |   |   |
|  Number missing |  1  |  1  |
|  Yes |  1 (100.0%)  |  1 (100.0%)  |
|  No |  0 (0.0%)  |  0 (0.0%)  |
| MV anterior leaflet thickening (>3mm), n (%) |   |   |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  2 (100.0%)  |  2 (100.0%)  |
| MV chordal thickening, n (%) |   |   |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  2 (100.0%)  |  2 (100.0%)  |
| Any restriction of the MV during diastole, n (%)  |   |   |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  2 (100.0%)  |  2 (100.0%)  |
| Any overlap/override of the anterior leaflet of the MV on the posterior leaflet during systole, n (%) |   |   |
|  Yes |  0 (0.0%)  |  1 (50.0%)  |
|  No |  2 (100.0%)  |  1 (50.0%)  |
| Adequate visualization of the AV, n (%) |   |   |
|  Yes |  2 (100.0%)  |  2 (100.0%)  |
|  No |  0 (0.0%)  |  0 (0.0%)  |
| Any AV regurgitation, n (%)  |   |   |
|  Yes |  1 (50.0%)  |  1 (50.0%)  |
|  No |  1 (50.0%)  |  1 (50.0%)  |
| Any irregular or focal thickening of the AV, n (%) |   |   |
|  Yes |  1 (50.0%)  |  1 (50.0%)  |
|  No |  1 (50.0%)  |  1 (50.0%)  |
| Any restriction in AV motion, n (%) |   |   |
|  Yes |  0 (0.0%)  |  0 (0.0%)  |
|  No |  2 (100.0%)  |  2 (100.0%)  |
| Normal coaptation of the AV, n (%) |   |   |
|  Yes |  2 (100.0%)  |  2 (100.0%)  |
|  No |  0 (0.0%)  |  0 (0.0%)  |

**\***P-value estimates not done due to small sample size