Supplemental Data

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Legend for tables and figures:

FDG-PET/CT: 18F-fluorodeoxyglucose positron emission tomography / computed tomography; DOR: diagnostic odds ratio; INTERMACS: interagency registry for mechanical circulatory support; MMB = medical microbiology; MV: metabolic volume (Cut-off: ≥ 9cm³) NLR: negative likelihood ratio; PLR: positive likelihood ratio.

In studies where there was insufficient data for assessment of true/false positives and negatives, these were left blank.
Table 4. Diagnostic performance of FDG PET/CT in patients with suspected infection of LVAD pump/pocket.

| Authors            | Reference standard for diagnostic performance assessment                                                                 | True positive | False negative | False positive | True negative | Sensitivity | Specificity | PLR          | NLR          |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------|---------------|---------------|---------------|---------------|-------------|-------------|--------------|--------------|
| Akin et al 2018    | Clinical course review by research group including medical history, comorbidities, cultures of blood and driveline (sternal wound if suspect), laboratory tests, imaging results and outcome at end of recorded follow-up. Diagnosis according to INTERMACS definition of LVAD infection. | 4             | 0             | 0             | 6             | 1.0         | 1.0         | ∞            | 0.00         |
| Avramovic et al 2017 | Clinical course review at the end of recorded follow-up or transplantation: clinical evidence of infection or recurrence of symptoms, swabs at driveline exit, along driveline, surgical samples if available and laboratory tests. Diagnosis according to INTERMACS definition of LVAD infection. | -             | -             | -             | -             | -           | -           | -            | -            |
| Bernhardt et al 2017 | ISHLT criteria at end of follow-up, based on clinical symptoms, cultures and swabs of exit site, along driveline and during surgery if available, and imaging data. In case of missing data, consensus diagnosis made during multidisciplinary meeting. | 4             | 1             | 0             | 13            | 0.800       | 1.0         | ∞            | 0.20         |
| Dell’ Aquila et al 2016 | Findings of MMB (cultures of skin and/or tissue surrounding driveline or central device components if available), surgery, clinical evidence of infection and recurrence of symptoms at end of recorded follow up, diagnosis according to INTERMACS definition of LVAD infection | -             | -             | -             | -             | -           | -           | -            | -            |
| Dell’ Aquila et al 2018 | Clinical evidence of infection, cultures of skin and/or tissue surrounding driveline or central device components if available), surgery and recurrence of symptoms at end of recorded follow up. diagnosis according to INTERMACS definition of LVAD infection | 13            | 3             | 6             | 39            | 0.813       | 0.867       | 6.09         | 0.22         |
| De Vaugelade et al 2019 | ISHLT criteria at end of follow-up, based on clinical symptoms, microbiology and imaging data. In case of missing data, consensus diagnosis made during multidisciplinary meeting. | 5             | 0             | 3             | 16            | 1.0         | 0.842       | 6.30         | 0.00         |
| Kanapinn et al 2019 | Consensus by 2 physicians with access to clinical criteria, findings of MMB (not further defined) and all diagnostic imaging (incl. FDG-PET/CT) | -             | -             | -             | -             | -           | -           | -            | -            |
| Kim et al 2019     | Findings of MMB, surgery, clinical evidence of infection and recurrence of symptoms; it was not reported who performed the reference test. | 23            | 0             | 0             | 12            | 1.0         | 1.0         | ∞            | 0.00         |
| Tam et al 2019     | Clinician determined presence or absence of LVAD infection based on history, laboratory tests, imaging studies and clinical outcome. Confirmation at 30 day follow up. | 10            | 0             | 5             | 4             | 1.0         | 0.444       | 1.80         | 0.00         |
| Sommerlath Sohns et al, 2019 | No reference test for extent of driveline / LVAD infection defined | -             | -             | -             | -             | -           | -           | -            | -            |
Table 5. Diagnostic performance of FDG PET/CT in patients with suspected *driveline* infection.

| Authors                  | Reference standard for diagnostic performance assessment                                                                                                                                                                                                 | True positive | False negative | False positive | True negative | Sensitivity | Specificity | PLR   | NLR   |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------|----------------|---------------|-------------|-------------|-------|-------|
| Akin et al, 2018         | Clinical course review by research group including medical history, comorbidities, cultures of blood and driveline (sternal wound if suspect), laboratory tests, imaging results and outcome at end of recorded follow-up. Diagnosis according to INTERMACS definition of LVAD infection.                        | 7             | 0              | 0              | 3             | 1.0         | 1.0         | ∞     | 0.00  |
| Avramovic et al, 2017    | Clinical course review at the end of recorded follow-up or transplantation: clinical evidence of infection or recurrence of symptoms, swabs at driveline exit, along driveline, surgical samples if available and laboratory tests. Diagnosis according to INTERMACS definition of LVAD infection.        | Visual 21     | 3              | 5              | 19            | 0.875       | 0.792       | 4.20  | 0.16  |
|                          | MV 23                                                                                                                             | 1             | 3              | 21             |               | 0.958       | 0.875       | 7.67  | 0.05  |
| Bernhardt et al, 2017    | ISHLT criteria at end of follow-up, based on clinical symptoms, cultures and swabs of exit site, along driveline and during surgery if available, and imaging data. In case of missing data, consensus diagnosis made during multidisciplinary meeting.   | 10            | 1              | 0              | 18            | 0.910       | 1.0         | ∞     | 0.09  |
| Dell’ Aquila et al, 2016 | Findings of MMB (cultures of skin and/or tissue surrounding driveline or central device components if available), surgery, clinical evidence of infection and recurrence of symptoms at end of recorded follow up, diagnosis according to INTERMACS definition of LVAD infection.    | -             | -              | -              | -             | -           | -           | -     | -     |
| Dell’ Aquila et al, 2018 | Clinical evidence of infection, cultures of skin and/or tissue surrounding driveline or central device components if available), surgery and recurrence of symptoms at end of recorded follow up, diagnosis according to INTERMACS definition of LVAD infection. | 35            | 1              | 0              | 25            | 0.972       | 1.0         | ∞     | 0.03  |
| De Vaugelade et al, 2019 | ISHLT criteria at end of follow-up, based on clinical symptoms, microbiology and imaging data. In case of missing data, consensus diagnosis made during multidisciplinary meeting.                                                                                               | 11            | 0              | 9              | 4             | 1.0         | 0.378       | 1.44  | 0.00  |
| Kanapinn et al, 2019     | Consensus by 2 physicians with access to clinical criteria, findings of MMB (not further defined) and all diagnostic imaging (incl. FDG-PET/CT)                                                                                                                 | 23            | 0              | 0              | 7             | 1.0         | 1.0         | ∞     | 0.00  |
| Kim et al, 2019          | Findings of MMB, surgery, clinical evidence of infection and recurrence of symptoms; it was not reported who performed the reference test.                                                                                                                  | 19            | 0              | 0              | 16            | 1.0         | 1.0         | ∞     | ∞     |
| Tam et al, 2019          | Clinician determined presence or absence of LVAD infection based on history, laboratory tests, imaging studies and clinical outcome. Confirmation at 30 day follow up.                                                                                           | 11            | 0              | 6              | 2             | 1.0         | 0.250       | 1.33  | 0.00  |
| Sommerlath Sohns et al, 2019 | No reference test for extent of driveline / LVAD infection defined                                                                                                                      | -             | -              | -              | -             | -           | -           | -     | -     |
Figure 6. NLR and PLR Forest plots for FDG PET/CT for infection of LVAD pump/pocket

**Negative Likelihood Ratio**

| Studies        | Estimate (95% C.I.) | (FN * Di-)/(TN * Di+) |
|----------------|---------------------|------------------------|
| Akin 2018      | 0.108 (0.007, 1.582) | 0/24                   |
| Bernhardt 2017 | 0.255 (0.016, 4.123) | 24/120                 |
| Dell Aquila 2018 | 0.216 (0.099, 0.473) | 135/624                |
| De Vaugelade 2019 | 0.101 (0.038, 0.270) | 0/80                   |
| Kim 2019       | 0.022 (0.001, 0.328)  | 0/276                  |
| Tam 2019       | 0.101 (0.057, 0.180)  | 0/40                   |
| Overall (I^2=0 %, P=0.486)  | 0.122 (0.082, 0.183)  | 159/1164               |

Overall NLR: 0.122

**Positive Likelihood Ratio**

| Studies        | Estimate (95% C.I.) | (TP * Di-)/(FP * Di+) |
|----------------|---------------------|------------------------|
| Akin 2018      | 12.600 (0.858, 185.047) | 24/0                   |
| Bernhardt 2017 | 37.500 (2.320, 696.016) | 96/0                   |
| Dell Aquila 2018 | 6.094 (2.790, 13.309)  | 585/96                 |
| De Vaugelade 2019 | 5.238 (1.963, 13.980)  | 95/15                  |
| Kim 2019       | 25.458 (1.679, 385.928) | 276/0                  |
| Tam 2019       | 1.736 (0.976, 3.085)   | 90/50                  |
| Overall (I^2=64.3 %, P=0.016)  | 5.557 (2.352, 13.130)  | 1166/161               |

Overall PLR: 5.557
Figure 7. NLR and PLR Forest plots for FDG PET/CT for driveline infection

**Negative Likelihood Ratio**

| Studies       | Estimate (95% C.I.) | (FN * Di-) / (TN * Di+) |
|---------------|---------------------|-------------------------|
| Akin 2018     | 0.071 (0.005, 0.961)| 0/21                    |
| Avramovic 2017| 0.158 (0.071, 0.349)| 72/456                  |
| Bernhardt 2017| 0.128 (0.008, 1.995)| 18/198                  |
| Dell Aquila 2018| 0.041 (0.003, 0.644)| 25/900                  |
| De Vaugelade 2019| 0.130 (0.089, 0.189)| 0/44                    |
| Kanapin 2019  | 0.022 (0.002, 0.326)| 0/161                   |
| Kim 2019      | 0.026 (0.002, 0.396)| 0/304                   |
| Tam 2019      | 0.150 (0.096, 0.229)| 0/22                    |

Overall (I^2=0%, P=0.718) 0.133 (0.103, 0.173) 115/2106

**Positive Likelihood Ratio**

| Studies       | Estimate (95% C.I.) | (TP * Di-) / (FP * Di+) |
|---------------|---------------------|-------------------------|
| Akin 2018     | 7.500 (0.558, 100.873)| 21/0                    |
| Avramovic 2017| 4.200 (1.898, 9.295) | 504/120                 |
| Bernhardt 2017| 33.250 (2.140, 516.717)| 180/0                   |
| Dell Aquila 2018| 49.892 (3.203, 777.189)| 875/0                   |
| De Vaugelade 2019| 1.412 (0.966, 2.064) | 143/99                  |
| Kanapin 2019  | 15.667 (1.069, 229.513)| 161/0                   |
| Kim 2019      | 33.150 (2.158, 509.121)| 304/0                   |
| Tam 2019      | 1.327 (0.870, 2.024)  | 88/66                   |

Overall (I^2=72.88%, P<0.001) 3.934 (1.875, 8.255) 2276/285
Figure 8. Forest plot Diagnostic Odds Ratio $^{18}$F-FDG PET/CT for LVAD pump/pocket and driveline infection

| Studies                  | Estimate (95% C.I.) | (TP * TN)/(FP * FN) |
|--------------------------|---------------------|---------------------|
| Akin et al 2018          | 85.000 (1.319, 5478.065) | 16/0                |
| Avramovic et al 2017     | 26.600 (5.589, 126.596)  | 399/15              |
| Bernhardt et al 2017     | 156.600 (6.877, 3566.114) | 182/0               |
| Dell'Aquila et al - 2018 | 22.500 (5.542, 91.353)  | 540/24              |
| De Vaugelade et al 2019  | 40.000 (1.749, 914.787)  | 40/1                |
| Kanapinn et al 2019      | 705.000 (12.846, 38691.742) | 161/0              |
| Kim et al 2019           | 855.000 (15.635, 46756.257) | 196/0              |
| Tam et al 2019           | 8.846 (0.366, 213.798)   | 22/0                |
| Overall ($I^2=0\%$, P=0.445) | 38.433 (16.535, 89.335)  | 1556/40             |

Overall DOR: 38.433
Figure 9. Forest plot Diagnostic Odds Ratio $^{18}$F-FDG PET/CT for driveline infection

| Studies         | Estimate (95% C.I.)          | (TP + TN)/(FP + FN) |
|-----------------|------------------------------|---------------------|
| Akin 2018       | 105.000 (1.705, 6464.654)    | 21/0                |
| Avramovic 2017  | 26.600 (5.589, 126.596)      | 399/15              |
| Bernhardt 2017  | 259.000 (9.659, 6945.214)    | 180/0               |
| Dell Aquila 2018 | 1207.000 (47.233, 30843.682) | 875/0              |
| De Vaugelade 2019 | 10.895 (0.518, 229.010)   | 44/0                |
| Kanapinn 2019   | 705.000 (12.846, 38691.742)  | 161/0               |
| Kim 2019        | 1297.000 (24.184, 68490.014) | 304/0              |
| Tam 2019        | 8.846 (0.366, 213.798)       | 22/0                |
| Overall (I^2=38.96 %, P=0.119) | 92.457 (22.711, 376.395) | 2006/15             |

Overall DOR: 92.457
Figure 10. Forest plot Diagnostic Odds Ratio $^{18}$F-FDG PET/CT for infection of LVAD pump/pocket

| Studies            | Estimate (95% C.I.) | (TP * TN)/(FP * FN) |
|--------------------|---------------------|---------------------|
| Akin 2018          | 117.000 (1.939, 7060.232) | 24/0                |
| Bernhardt 2017     | 147.000 (5.133, 4209.848) | 96/0                |
| Dell Aquila 2018   | 28.167 (6.152, 128.968)  | 507/18              |
| De Vaugelade 2019  | 51.857 (2.298, 1170.117) | 80/0                |
| Kim 2019           | 1175.000 (21.966, 62852.646) | 276/0              |
| Tam 2019           | 17.182 (0.775, 380.840)   | 40/0                |
| Overall (I²=0 % , P=0.552) | **49.434 (16.716, 146.187)** | 1023/18            |

Overall DOR: 49.434
Search Strings:

Embase: ('left ventricular assist device'/exp OR 'lvad' OR 'left ventricular assist device' OR 'ventricular assist device'/exp OR 'ventricular assist device' OR 'vad' OR 'driveline infection') AND ('infection'/exp OR 'infection' OR 'bacterial endocarditis'/exp OR 'infective endocarditis') AND ('positron emission tomography'/exp OR 'positron emission tomography') NOT ('case report'/exp OR 'case report')

Pubmed: (Left ventricular assist device[tiab] OR LVAD[tiab] OR Ventricular Assist Device[tiab] OR VAD[tiab] OR Driveline infection[tiab]) And (infection[tiab] OR endocarditis[tiab] OR Endocarditis[mesh]) AND (Positron emission tomography[tiab] OR PET) NOT (case report[tiab])