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| **Supplementary Table 1.** Summary of patients with positive microbiological tests | | | | | | | | |
| Patienta | **1 (A)** | **2 (A)** | **3 (A)** | **4 (A)** | **5 (B)** | **6 (B)** | **7 (B)** | **8 (B)** |
| **Demographics** |  |  |  |  |  |  |  |  |
| Sex | Female | Male | Male | Male | Female | Female | Male | Female |
| Age (years) | 74 | 84 | 53 | 37 | 70 | 74 | 81 | 65 |
| BMI (kg/m2) | 28,8 | 15,5 | 30,8 | 35,9 | 31,9 | 24,2 | 22 | 27,2 |
| Cardiovascular disease | HT | MI | HT | No | HT | HT;  Valve disease | No | HT;  AF |
| Chronic lung  disease | Asthma | COPD | No | No | Asthma | Asthma | No | No |
| Diabetes mellitus | No | No | Yes | No | No | No | No | No |
| Immuno-compromised | No | No | No | No | No | No | No | No |
| Smoking | Former | Former | No | N.a | Former | Former | No | Former |
| **Symptoms/**  **signsb** |  |  |  |  |  |  |  |  |
| Duration of  symptoms before admission  (days) | 7 | 14 | 9 | 8 | 14 | 21 | 4 | N.a |
| Productive cough | No | Yes | Yes | No | No | No | No | No |
| qSOFA | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 |
| CRB-65 | 2 | 1 | 0 | 1 | 1 | 1 | 2 | 1 |
| **Laboratory resultsb** |  |  |  |  |  |  |  |  |
| CRP (mg/L) | 99 | 46 | 217 | 74 | 123 | 118 | 41 | 364 |
| PCT (µg/L) | N.p | 0,38 | 0,18 | 0,3 | N.p | 0,08 | 0,32 | 2,09 |
| Neutrophils (x109/L) | 6,1 | 12,5 | 8,7 | 3,2 | 10,0 | 3,7 | 1,6 | 10,1 |
| Lymphocytes (x109/L) | 1,0 | 1,2 | 0,8 | 0,8 | 0,8 | 1,0 | 0,8 | 0,8 |
| **Radiologyb** |  |  |  |  |  |  |  |  |
| CO-RADS | N.a | N.a | N.a | N.a | 5 | 5 | 5 | 4 |
| **Microbiologyc** |  |  |  |  |  |  |  |  |
| PUAT | N.p | N.p | N.p | Negative (0) | N.p | N.p | N.p | N.p |
| LUAT | N.p | N.p | N.p | Negative (0) | N.p | N.p | N.p | N.p |
| Sputum culture | *S. maltophilia; A. fumigates;*  *C. albicans* (4) | *E. coli* (2) | *S. aureus* (7) | *S. aureus* (7) | *Achromo-*  *bacter* species; *A. fumigates; C. albicans* (6) | *S. aureus;*  *C. albicans*  (7) | N.p | N.p |
| Gram stain of  sputum culture | N.a | L 1+;  GNR 2+  GPC 2+  Yeast | L 3+  GPC 2+ | L 1+  GNR 2+  GNC 1+  GPC 2+ | SC 1+  L 1+ | N.a |  |  |
| Blood culture | Negative (1) | Negative (1) | N.p | Negative (1) | Negative (1) | Negative (1) | E. coli (1) | *S. pneumoniae*  (1) |
| Clinical interpretation | Pneumonia | Coloni-zation | Possible pneumonia | Coloni-zation | Coloni-zation | Pneumonia | Unknown focus | Pneumonia |
| **Outcome** |  |  |  |  |  |  |  |  |
| ICU admissiond | Yes (1) | No | Yes (5) | Yes (4) | Yes (1) | Yes (6) | No | No |
| Mortality | Alive | Alive | Deceased | Deceased | Alive | Deceased | Deceased | Alive |
| Abbreviations: AF: Atrial Fibrillation; AP: Angina Pectoris; COPD: Chronic Obstructive Pulmonary Disease; CO-RADS: COVID-19 Reporting and Data System; CRB-65: Confusion, Respiratory rate, Blood pressure, ≥65 years; CRP: C-reactive protein; GNC: gram-negative Cocci; GNR: gram-negative Rods; GPC: pram-positive cocci; GPR: gram-positive rods; HT: Hypertension; L: Leucocytes; LUAT: Legionella Urinary Antigen Test; MI: Myocardial Infarction; N.a: Not available; N.p: Not performed; PCT: Procalcitonin; PE: pulmonary embolism; PUAT: Pneumococcal Urinary Antigen Test; qSOFA: quick Sequential Organ Failure assessment; SC: Squamous Cells; UTI: Urinary Tract Infection.  aLetter between brackets corresponds with hospital in Table 1  bUpon admission.  cThe number of days after admission on which microbiological tests (PUAT, LUAT, sputum culture and blood culture) have been performed is shown between brackets. Day 1 was the day of presentation at the emergency room or the day of first clinical suspicion in already admitted patients.  dThe number of days after admission when the patient was admitted to the ICU is shown between brackets. Day 1 was the day of presentation at the emergency room or the day of first clinical suspicion in already admitted patients. | | | | | | | | |

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| **Supplementary Table 1.** Summary of patients with positive microbiological tests(continued) | | | | | | | |
| Patienta | **9 (B)** | **10 (C)** | **11 (D)** | **12 (D)** | **13 (D)** | **14 (D)** | **15 (D)** |
| **Demographics** |  |  |  |  |  |  |  |
| Sex | Female | Female | Male | Male | Male | Male | Female |
| Age (years) | 64 | 87 | 57 | 65 | 38 | 75 | 70 |
| BMI (kg/m2) | 25,5 | 32,4 | 29,9 | 24,8 | 26,2 | 25,2 | 27,9 |
| Cardiovascular disease | HT;  AF | AF | AP | HT;  MI | No | No | AF;  stroke |
| Chronic lung  disease | COPD | No | COPD | No | No | COPD | PE |
| Diabetes mellitus | No | Yes | No | No | Yes | No | No |
| Immuno-compromised | No | No | No | No | Yes | No | No |
| Smoking | Former | No | Yes | Former | No | N.a. | No |
| **Symptoms/**  **signsb** |  |  |  |  |  |  |  |
| Duration of  symptoms before admission  (days) | 14 | 4 | 4 | 10 | 2 | 7 | 21 |
| Productive cough | Yes | Yes | No | Yes | Yes | No | No |
| qSOFA | 1 | 0 | 1 | 1 | 0 | 1 | 0 |
| CRB-65 | 1 | 2 | 0 | 2 | 0 | 1 | 2 |
| **Laboratory resultsb** |  |  |  |  |  |  |  |
| CRP (mg/L) | 34 | 21 | 88 | 55 | 95 | 258 | 244 |
| PCT (µg/L) | 0,03 | 0,12 | N.p. | 1,27 | 0,75 | 0,6 | 2,11 |
| Neutrophils (x109/L) | 8,9 | 3,3 | 6,0 | N.p | N.p. | 5,62 | 13,0 |
| Lymphocytes (x109/L) | 1,1 | 2,0 | 0,38 | N.p | N.p. | 0,47 | 0,99 |
| **Radiologyb** |  |  |  |  |  |  |  |
| CO-RADS | 3 | N.a | 5 | 5 | 5 | 4 | 5 |
| **Microbiologyc** |  |  |  |  |  |  |  |
| PUAT | N.p | Positive (6) | Negative (1) | Negative (1) | Negative (2) | Negative (1) | N.p. |
| LUAT | N.p | Negative (6) | Negative (1) | Negative (1) | Negative (2) | Negative (1) | N.p. |
| Sputum culture | *H. parainfluenzae;*  *C. albicans* (2) | *H. influenzae* (6) | *S. aureus* (6) | *S. aureus*  (2) | N.p. | *K. oxytoxa;*  *S. aureus*  (2) | N.p. |
| Gram stain of  sputum culture | L 4+  GNR 4+  GPR 2+  GPC 1+ | L 3+  GNR 3+  GPC 3+ | L 1+  GNC 2+  GPC 2+ | SC 3+  L 2+  GNR 2+  GPR 1+  GPC 4+ |  | SC 3+  L 2+  GNR 2+  GPR 2+  GPC 2+ |  |
| Blood culture | Negative (1) | Negative (1) | Negative (1) | Negative (1) | *S. aureus* (1) | Negative  (1) | *E. coli*  (2) |
| Clinical interpretation | Pneumonia | Pneumonia | Pneumonia;  Influenza A | Pneumonia | Cellulitis | Pneumonia | UTI |
| **Outcome** |  |  |  |  |  |  |  |
| ICU admissiond | No | No | Yes (4) | Yes (2) | No | Yes (1) | No |
| Mortality | Alive | Alive | Alive | Alive | Alive | Deceased | Alive |
| Abbreviations: AF: Atrial Fibrillation; AP: Angina Pectoris; COPD: Chronic Obstructive Pulmonary Disease; CO-RADS: COVID-19 Reporting and Data System; CRB-65: Confusion, Respiratory rate, Blood pressure, ≥65 years; CRP: C-reactive protein; GNC: gram-negative Cocci; GNR: gram-negative Rods; GPC: pram-positive cocci; GPR: gram-positive rods; HT: Hypertension; L: Leucocytes; LUAT: Legionella Urinary Antigen Test; MI: Myocardial Infarction; N.a: Not available; N.p: Not performed; PCT: Procalcitonin; PE: pulmonary embolism; PUAT: Pneumococcal Urinary Antigen Test; qSOFA: quick Sequential Organ Failure assessment; SC: Squamous Cells; UTI: Urinary Tract Infection.  \*Letter between brackets corresponds with hospital in Table 1  †Upon admission.  ⱡThe number of days after admission on which microbiological tests (PUAT, LUAT, sputum culture and blood culture) have been performed is shown between brackets. Day 1 was the day of presentation at the emergency room or the day of first clinical suspicion in already admitted patients.  §The number of days after admission when the patient was admitted to the ICU is shown between brackets. Day 1 was the day of presentation at the emergency room or the day of first clinical suspicion in already admitted patients. | | | | | | | |

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| **Supplementary Table 2.** Length of treatment in patients who received antibiotic treatment within 24 hours of admissiona. One patient with missing stop date was excluded. | | | | | |
| Treatment duration in days | Total  No. of patients | A  No. of patients | B  No. of patients | C  No. of patients | D  No. of patients |
| 1 | 152 | 90 | 41 | 19 | 2 |
| 2 | 151 | 79 | 32 | 32 | 8 |
| 3 | 62 | 31 | 21 | 10 | 0 |
| 4 | 58 | 23 | 15 | 13 | 7 |
| 5 | 44 | 15 | 15 | 7 | 7 |
| 6 | 44 | 23 | 6 | 9 | 6 |
| 7 | 22 | 7 | 5 | 10 | 0 |
| 8 | 8 | 3 | 2 | 1 | 2 |
| 9 | 6 | 5 | 0 | 1 | 0 |
| 10 | 3 | 1 | 1 | 1 | 0 |
| 11 | 3 | 2 | 1 | 0 | 0 |
| 12 | 1 | 0 | 0 | 1 | 0 |
| 13 | 0 | 0 | 0 | 0 | 0 |
| 14 | 0 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 0 | 0 | 0 |
| 16 | 1 | 0 | 0 | 1 | 0 |
| acorresponds with Figure 2 in the manuscript | | | | | |

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| **Supplementary Table 3.** Length of treatment in patients that received antibiotic treatment within 24 hours of admission, excluding the patients who were admitted to the ICU during the first week. One patient with missing stop date was excluded. | | | | | |
| Treatment duration in days | Total  No. of patients | A  No. of patients | B  No. of patients | C  No. of patients | D  No. of patients |
| 1 | 122 | 66 | 38 | 17 | 1 |
| 2 | 123 | 63 | 24 | 29 | 7 |
| 3 | 53 | 25 | 19 | 9 | 0 |
| 4 | 48 | 19 | 12 | 12 | 5 |
| 5 | 31 | 10 | 12 | 7 | 2 |
| 6 | 32 | 17 | 3 | 8 | 4 |
| 7 | 17 | 6 | 2 | 9 | 0 |
| 8 | 3 | 2 | 1 | 0 | 0 |
| 9 | 3 | 3 | 0 | 0 | 0 |
| 10 | 3 | 1 | 1 | 1 | 0 |
| 11 | 1 | 1 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 1 | 0 |
| 13 | 0 | 0 | 0 | 0 | 0 |
| 14 | 0 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 0 | 0 | 0 |
| 16 | 1 | 0 | 0 | 1 | 0 |