**Cardiac Output in Sepsis ICU Admissions**

**Aim:**

Evaluate cardiac output during ICU stay. Exclude patients with pacemakers. Compare cardiac output for different patient subgroups, namely vasopressor use, survivors/non-survivors and suppressed/normal/hyperdynamic left-ventricular ejection fraction (LVEF).

**Cohort Summary:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | No. | % | Age | Length of Stay (median) |
| Patients | 2817 |  |  |  |
| Gender |  |  |  |  |
| M | 2006 | 56.4 | 62.9(16.7) | 4.6 |
| F | 1573 | 43.5 | 63.4(16.6) | 4.5 |
| Sepsis ICU admissions | 3580 |  |  |  |
| Vasopressors |  |  |  |  |
| Y | 1966 | 54.9 | 63.4(15.7) | 7.1 |
| N | 1614 | 45.1 | 61.8(17.6) | 2.8 |
| 30-day Mortality |  |  |  |  |
| Survivors | 2456 | 68.6 | 61.5(17.2) | 4.6 |
| Non-Survivors | 1124 | 31.4 | 66.8(14.8) | 4.3 |
| Echos – LVEF | 1519 |  |  |  |
| Suppressed (<35) | 40 | 2.6 | 63.0(13.2) | 8.2 |
| Mild Suppression (30-55) | 187 | 12.3 | 60.5(16.1) | 5.8 |
| Normal (55-75) | 1119 | 73.7 | 60.9(15.6) | 5.8 |
| Hyperdynamic (>75) | 173 | 11.4 | 62.6(14.9) | 6.6 |

**Assessing Cardiac Output using MIMIC II**

Stroke volume multiplied by heart rate is the typical way of estimating cardiac output. However, in MIMIC II, stoke volume is only available in a small subset of patients, therefore we have used pulse pressure (systolic minus diastolic blood pressure) as a proxy for stroke volume. The following variables were extracted from MIMIC II with noting the time of the observation as time after ICU admission in minutes:

* HR
* Pulse pressure (both invasive and non-invasive)
* Lactic acid
* Urine output

**Results**

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| --- | --- |
| **Macintosh HD:Users:tombombadl:Research:Projects:Cardiac_Output:Figure:22May:pulsep_survivors.png** | **Macintosh HD:Users:tombombadl:Research:Projects:Cardiac_Output:Figure:22May:hr_survivors.png** |
| **Macintosh HD:Users:tombombadl:Research:Projects:Cardiac_Output:Figure:22May:lactate_survivors.png** | **Macintosh HD:Users:tombombadl:Research:Projects:Cardiac_Output:Figure:22May:urine_survivors.png** |

**Figure 1:** Hourly averages of pulse pressure (systolic minus diastolic blood pressure, noninvasive), heart rate, lactic acid and urine output for survivors and non-survivors (28-day mortality)

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| Macintosh HD:Users:tombombadl:Research:Projects:Cardiac_Output:Figure:22May:pulsep_vasopressors.png | Macintosh HD:Users:tombombadl:Research:Projects:Cardiac_Output:Figure:22May:hr_vasopressors.png |
| Macintosh HD:Users:tombombadl:Research:Projects:Cardiac_Output:Figure:22May:lactate_vasopressors.png | Macintosh HD:Users:tombombadl:Research:Projects:Cardiac_Output:Figure:22May:urine_vasopressors.png |

**Figure 2:** Hourly averages of pulse pressure (systolic minus diastolic blood pressure, noninvasive), heart rate, lactic acid and urine output with or without vasopressor therapy

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| **Macintosh HD:Users:tombombadl:Research:Projects:Cardiac_Output:Figure:22May:pulsep_lvef.png** | **Macintosh HD:Users:tombombadl:Research:Projects:Cardiac_Output:Figure:22May:hr_lvef.png** |
| **Macintosh HD:Users:tombombadl:Research:Projects:Cardiac_Output:Figure:22May:lactate_lvef.png** | **Macintosh HD:Users:tombombadl:Research:Projects:Cardiac_Output:Figure:22May:urine_lvef.png** |

**Figure 3:** LV Ejection Fraction: Suppressed (<35%), Mild-surppression (35-55%), Normal (55-70%), Hyperdynamic (>70%)