Sepsis on the death certificate – Is a change to rule 3 necessary?

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Abstract

Sepsis is a severe condition that is one of the leading direct causes of death in intensive care. Still, sepsis is a disease that is most often caused by other diseases. Therefore, it is found on the death certificate as the most recent cause on line 1a. If the certifier did specify a correct sequence the underlying cause will be assigned for the cause that originally caused the sepsis, eg. an injury or a neoplasm.

In volume two of the ICD-10 rules are given on how to code death certificates in order to reach internationally consistent coding of the underlying cause code. In rule three there are extensive specifications in how to handle certificates with pneumonia, a common complication of many severe diseases. Still, there are no such rules for how to handle sepsis even if this could be seen as a common complication of many severe diseases, too.

This paper recommends revisiting rule three and modifying it in order to standardise the coding of certificates with the mention of sepsis. Additionally, the authors recommend developing standardised sets of rules for multiple cause analysis of certificates with the mention of sepsis as sepsis is of great importance for public health planning and a frequent topic of medical research.
**Sepsis - a severe disease with a high mortality ratio**

Despite recent advances in medicine sepsis remains one of the leading immediate causes of death in critically ill patients. Sepsis is defined as Systemic Inflammatory Response Syndrome (SIRS) caused by an infective organism, may it be bacterial, viral or fungal. Depending on severity of the disease, severe sepsis is defined as sepsis with organ failure, while multiple organ dysfunction syndrome (MODS) indicates malfunction of more than one organ. Infection related organ dysfunction in this context of severe sepsis relates to acute encephalopathy, thrombocytopenia and arterial hypoxemia as a sign of pulmonary dysfunction, arterial hypotension, renal failure and metabolic acidosis. Finally, septic shock is defined as sepsis with hypotension in spite of adequate volume resuscitation. The pathophysiology of sepsis is determined by a dysregulated immune system with hyper- and hypo-inflammatory aspects causing impairment on multiple levels.

SIRS occurs in up to 80% of critically ill patients and up to 30% will progress to sepsis. A further 10-15% will develop severe sepsis and multiple organ failure [1]. According to Brun-Buisson the overall mortality for sepsis ranges around 20 % and up to 40-60% for patients with septic shock [1]. According to estimates within the United States there is a prevalence of 3 cases per 1000 citizens acquiring sepsis. In the United States, the average morbidity is 28.6% and increases up to 38.5% for patients above 85 years of age. The overall costs for treating sepsis run at 16.7 million dollars US per annum, 22,000 $ per case. Since 1995 the incidence has been steadily increasing by 1.5 % per year [2;3]. In Germany, a recent survey of the SepNet study group reported a 54% mortality in severe sepsis [4;5]. A French multicentred study revealed that most cases of sepsis are nosocomial, up to 25% are acquired within the critical care setting.

**Sepsis coding – not clearly regulated**

The coding of septicaemia is inconsistent and not explicitly regulated in Volume 2. As sepsis is a disease that rarely is found as a single diagnosis but rather develops as a consequence of another severe disease. In cases where all diagnoses are entered in part one of the death certificate it is easy to establish the correct causal relationships and to reach the correct underlying cause. But what about cases where only sepsis is entered in part one and other severe diseases in part 2 of the certificate?

For pneumonia elaborate regulations are formulated for such certificates in Rule 3. Some of these might as well apply for sepsis.

In the following Table a list of conditions is given that are mentioned in rule 3 for combination with pneumonia. From a medical point of view it does not make sense to treat sepsis differently for some of the diagnosis.

<table>
<thead>
<tr>
<th>Pneumonia</th>
<th>According to Rule 3 combined with</th>
</tr>
</thead>
<tbody>
<tr>
<td>J18.1 (Lobar pneumonia, unspecified)</td>
<td>F10.2 (Mental and behavioural disorders due to use of alcohol - Dependence syndrome)</td>
</tr>
<tr>
<td>J12-J18</td>
<td>Conditions that impair the immune system</td>
</tr>
<tr>
<td>J15.0-J15.6, J15.8-J15.9, J16.8, J18.0 and</td>
<td>Wasting diseases (such as malignant neoplasm and</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Code Range</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
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</tr>
<tr>
<td>J18.2-J18.9</td>
<td>Malnutrition</td>
</tr>
<tr>
<td>J15.0-J15.6, J15.8-J15.9, J16.8, J18.0 and J18.2-J18.9</td>
<td>Diseases causing paralysis (such as cerebral haemorrhage or thrombosis)</td>
</tr>
<tr>
<td>J15.0-J15.6, J15.8-J15.9, J16.8, J18.0 and J18.2-J18.9</td>
<td>Serious respiratory conditions</td>
</tr>
<tr>
<td>J15.0-J15.6, J15.8-J15.9, J16.8, J18.0 and J18.2-J18.9</td>
<td>Communicable diseases</td>
</tr>
<tr>
<td>J15.0-J15.6, J15.8-J15.9, J16.8, J18.0 and J18.2-J18.9</td>
<td>Serious injuries.</td>
</tr>
<tr>
<td>J15.0-J15.6, J15.8-J15.9, J16.8, J18.0 and J18.2-J18.9, J69.0, and J69.8</td>
<td>Conditions that affect the process of swallowing</td>
</tr>
</tbody>
</table>

The following list of codes shows the sepsis codes in Volume 1 which might be applicable for such a combination via Rule 3:

- A02.1 Salmonella septicaemia
- A22.7 Anthrax septicaemia
- A24.1 Acute and fulminating melioidosis
- A26.7 Erysipelothrix septicaemia
- A32.7 Listerial septicaemia
- A40.0 Septicaemia due to streptococcus, group A
- A40.1 Septicaemia due to streptococcus, group B
- A40.2 Septicaemia due to streptococcus, group D
- A40.3 Septicaemia due to Streptococcus pneumoniae
- A40.8 Other streptococcal septicaemia
- A40.9 Streptococcal septicaemia, unspecified
- A41.0 Septicaemia due to Staphylococcus aureus
- A41.1 Septicaemia due to other specified staphylococcus
- A41.2 Septicaemia due to unspecified staphylococcus
- A41.3 Septicaemia due to Haemophilus influenzae
- A41.4 Septicaemia due to anaerobes
- A41.5 Septicaemia due to other Gram-negative organisms
- A41.8 Other specified septicaemia
- A41.9 Septicaemia, unspecified
- A42.7 Actinomycotic septicaemia
- B00.7 Disseminated herpesviral disease
- B37.7 Candidal septicaemia
Sepsis coding – a step forward?

The authors propose a two step approach to this problem:

1. For a near future change to Volume 2 obvious reasons for sepsis should be mentioned in Rule 3 for combination, like multiple injuries, major surgery or diseases involving long term Intensive care treatment.

2. A more detailed investigation should be performed on multiple cause data and then be analysed thoroughly from a medical and scientific view to develop:
   a. Specific rules for Volume two on which causes should be combined with Sepsis
   b. Develop multiple cause analysis templates for sepsis in order to further investigate this diagnosis of great medical, financial and public health impact.

References


