
Supplementary Online Content

Diel R, Lampenius N. Cost-benefit analysis of VKA versus NOAC treatment in German patients with atrial fibrillation utilizing patient self-testing. *JHEOR* 2019;6(3):142-59.

Appendix:

1. Baseline coding of AF patients
2. Ischemic insult G-ICD 10-I62.x (or transient ischemic attack, TIA)
3. Hemorrhagic insult
4. Major bleedings

This supplementary material has been provided by the authors to give readers additional information about their work.

Appendix

Reimbursement of hospital costs for treating an ischemic and hemorrhagic stroke and major bleedings:

1. Baseline coding of AF patients

The coding is carried out according to the current German coding guidelines (<http://www.g-drg.de>) using the webgrouper of the University of Münster [20]. Following the study of Ujeyl et al. [21], that assessed the most common comorbidities in German AF patients, the following diseases are also coded for each patient in addition to the diagnosis “atrial fibrillation” (G-ICD 10 I48.1):

- Left heart failure I50.1
- Hypertension I11.00
- Diabetes mellitus, type 2 E11.50 (not decompensated)
- KHK I25.19 (unspecified)
- Chronic gastritis and duodenitis (upper GI disease) K29.5

Clinical consequences of stroke such as G81.0 (creating hemiparesis and hemiplegia) or R47.0 (aphasia) are generally not revenue-relevant and therefore will not be coded.

2. Ischemic insult G-ICD 10-I62.x (or transient ischemic attack, TIA)

In all patients with stroke suspicion an immediate neuroradiological diagnosis with the aim to detect cerebral ischemia or to exclude differential diagnoses (intracerebral hemorrhage, subarachnoid hemorrhage, etc.) and to define treatment options (systemic thrombolysis or mechanical recanalization). Thus, the following procedures (OPS) are included in the coding of ischemic stroke:

- Cerebral CT native OPS 3-200
- CT Angiography OPS 3-600
- Neurological complex treatment OPS 8-981.0
- Complex differential diagnostic sonography of the vascular system with quantitative evaluation OPS 3-035

The calculated reimbursement for the costs of hospitalization for ischemic stroke without systemic thrombolysis is or for TIA €4,948.78 [USD 5,589.65].

3. Hemorrhagic insult

Prerequisite for the treatment is the unambiguous distinction between an intracerebral hemorrhage of a ischemic stroke, since the therapeutic concepts, especially in the acute phase, differ from each other. On the basis of anamnestic data and clinical findings, a clear distinction is not possible. A distinction can only be made by neuroradiological imaging techniques, i.e., computer tomography (cCT) (or cerebral magnetic resonance imaging (cMRT)). The treatment strategies of ischemia and intracerebral hemorrhage are different - a hypotensive therapy cannot be assigned to OPS.

The revenue from hemorrhagic stroke including hypothermia treatment is €5,480.52 [USD 6,190.25]. Since decompressive craniectomy (OPS 5-012.0) is still a matter of controversial debate with respect to age and functional outcome, no coding of this measure will be provided.

4. Major bleedings

Of the plethora of G-ICD-10 hemorrhagic diseases, only those were used that were most likely not caused by the disease itself (e.g. duodenal ulcer with bleeding and perforation), but by a complication of anticoagulation. Intracranial hemorrhages are attributed to the hemorrhagic insult.

Therefore, the following possibilities of G-ICD-10 encryption remain:

- 1.) K92.2 Gastrointestinal bleeding unspecified
- 2.) K62.5 Hemorrhage of the anus and rectum (OPS 1-654.1 rectoscopy with a rigid instrument). Note: It is advisable to perform a gastroduodenal endoscopy here as well
- 3.) R04.2 hemoptysis (tracheobronchoscopy OPS 1-690.0)
- 4.) K25.4 Ulcer ventriculi: Chronic or unspecified, with bleeding
- 5.) K26.4 Duodenal ulcer: Chronic or unspecified, with bleeding
- 6.) K28.4 Peptic ulcer jejuni: Chronic or unspecified, with bleeding

The corresponding revenue amounts to hospital main diagnoses (the example of a 78-year-old male patient with atrial fibrillation and corresponding comorbidities) amounts to the following: Overall, revenues for possible causes of “major bleeding” as hospital main diagnoses due to different locations and required procedures vary between €3,474.07 [USD 3,923.96] and €3,814.39 [USD 4,308.35]. We took the highest amount of €3,814.39 [USD 4,308.35] as baseline for our model input.