THE ASSESSMENT OF MEDICAL COMORBIDITY IN THE ELDERLY PATIENTS WITH DEMENTIA

Letiția Dobranici*, Cătălina Tudose**

Abstract:
Medical comorbidity is common in elderly patients with dementia and may be associated with substantial impairment, worse health decline and mortality. Medical comorbidity has also measurable effects on the functional outcomes of dementia patients. Treatment selection bias occurs when a patient’s treatment is determined or influenced by factors other than the disease itself. This is why psychiatrists should increase their efforts to detect and treat this comorbidity. In this article we aim to clarify several aspects regarding the meaning of the term comorbidity by reviewing its definitions and its effects, and also by presenting several comorbidity instruments. We focus on the role of Cumulative Illness Rating Scale For Geriatrics in the assessment of comorbidity in elderly people with dementia. We conclude that more knowledge about comorbidity and adequate instruments to measure it would lead to improved research of dementia in clinical care.

Key words: CIRS-G, cognitive impairment, old patient

Rezumat:
Comorbiditatea medicală este frecvent întâlnită la vârstnici cu demență și se poate asocia cu o deteriorare semnificativă, un declin mai sever al stării de sănătate și mortalitate. De asemenea, comorbiditatea medicală are efecte măsurabile asupra funcționalității pacienților cu demență. Erorile de alegere a tratamentului apar frecvent atunci când acesta este determinat sau influențat și de alți factori decât de boala în sine. De aceea, psihiatrii ar trebui să-și sporească eforturile de a depista și trata aceste comorbidități. În acest articol am dorit să clarificăm câteva aspecte legate de semnificația termenului de comorbidity revizuiindu-i definiții și efectele și, de asemenea, să prezentăm câteva instrumente de evaluare a comorbidității. Ne-am concentrat asupra rolului scalei Cumulative Illness Rating Scale For Geriatrics în evaluarea comorbidității vârstnicilor cu demență. Concluzionăm că o mai bună cunoaștere a conceptului de comorbidity și a unor instrumente adecvate de măsurare a acesteia pot conduce la îmbunătățirea cercetării demeneței în practica clinică.

Cuvinte cheie: CIRS-G, declin cognitiv, pacient vârstnic
DIFFICULTIES IN DEFINING AND THE CONCEPTUALIZATION OF COMORBIDITY

Apparently easy to define if we were to consider the etymology of the word (prefix "co" = added, with "Morus" = disease), comorbidity generates controversy both in meaning of the term, the effects it has over the patient and by the difficulty to measure it. Feinstein described the term comorbidity as “any distinct additional entity that has existed or may occur during the clinical course of a patient who has the index disease under study.” (1) Currently, the term comorbidity has two definitions. The first one indicates a medical condition existing simultaneously but independently with another condition in a patient (this is the older and more "correct" definition). A second definition indicates a medical condition in a patient that causes, is caused by, or is otherwise related to another condition in the same patient (this is a newer, nonstandard definition and less well-accepted). (2) In psychiatry, comorbidity refers to the presence of more than one mental disorder occurring in an individual at the same time.

Therefore, some authors differentiate between comorbidity and multimorbidity (coexistence of two or more diseases in a patient without designating a primary disease - disease index). (3)

A particular example of multimorbidity is the dual diagnosis in psychiatry, where two distinct disorders coexist without any implicit ordering (eg, schizophrenia or any severe mental illness and substance abuse). Supporters of the concept of multimorbidity tend to focus on primary care, a setting where the identification of an index disease is quite often neither obvious nor useful. (4,5)

The difficulty to define comorbidity emerges from several reasons. One of them is the very nature of health problems involved. Differentiating the nature of conditions is critical to the conceptualization of comorbidity, because simultaneous occurrence of loosely defined medical entities may signal a problem with the classification system itself. (6, 7) For example, many professionals do not consider depression and anxiety as two separate diagnostic entities but regard them as part of the same spectrum, meaning that if one patients has depression and anxiety, those should not considered comorbid disorders.

Another reason for the problems emerged in the conceptualization of comorbidity is difficulty to determine the index disease (primary disease) (9) considering the definition of Felstein. Depending on the research, different diseases can be considered a disease index. The conceptualization of comorbidity becomes more problematic when considering diseases that might be viewed just as possible complications of other diseases. (4) This is why, it is often preferred the term multimorbidity which implies the presence of several chronic or acute diseases in the same person without reference to a disease index. (10) The question is who determines the comorbid disease of a patient vs. its disease index? For example, in the case of a patient with hypertension, cancer and depression, his general practitioner will consider all three diseases being interested in the patient’s multimorbidity, while the psychiatrist will consider cancer and hypertension as comorbidity and the cardiologist will look at depression and cancer as comorbidities of the patient.

The complexity of defining comorbidity derives also from the different span of time across which the co-occurrence of two or more medical conditions is assessed. (11) What period of time should we consider when we follow a patient’s
Comorbidity? Moreover, the onset of diseases is rarely synchronous and the establishment of the correct sequence in which comorbidities appear may be important for the prognosis and treatment. For example, patients with diabetes who are recently diagnosed with major depression may have a different clinical presentation than those with an old diagnosis of major depression who are subsequently diagnosed with diabetes, yet all can be considered as patients with diabetes and depression.

Despite all these problems, for simplicity, we will consider comorbidity as a list of diseases/disorders relevant to the patient, which may influence his prognosis, excluding the disease of primary interest (the index disease). (12) For example, for a patient recently diagnosed with dementia, comorbidity includes diabetes, hypertension and prostate adenoma that he might have associated.

**COMORBIDITY INDEX AND SEVERITY INDEX**

A comorbidity index reduces all the coexistent illnesses and the severity of those illnesses to a single numeric score, allowing comparison with scores from other patients. The score indicates the overall severity of a patient’s medical problems, and the score may vary within a single patient, depending on the disease of interest. Comorbidity index should not be confused with an assessment of the impact of all illnesses on the overall health of a patient. These are performance scales or functional assessment scales (such as the Activities of Daily Living [ADL]). (12)

A comorbidity index is a research tool usually used in retrospective or prospective observational studies that need to stratify patients into groups with similar risk. In clinical trials, performance indices have been traditionally used. Comorbidity indices by design are too coarse to replace clinical judgment in the clinical decision making for a specific patient. (12)

Another index of interest for the clinician is the severity index representing the total score divided by the total number of categories/diseases present in the instrument of comorbidity we use; Severity Index = (total score/total number of categories endorsed) (13).

**WHY ARE WE INTERESTED IN COMORBIDITY?**

Choice of medical treatment errors may occur more frequently when it is conditioned by other factors than the disease itself. Typical examples in this regard are age, personal preferences, institutionalization and, not least, somatic comorbidities. (14) Kaplan and Feinstein stated that the influence of comorbidities and age is carefully considered in clinical practice but is generally ignored in research studies. (15, 2)

Medical comorbidity is common for older people with or without dementia in the primary care system. (16) Concomitant somatic diseases significantly reduce the independence of people with dementia and complicate the outcome and treatment of the disease. Moreover, despite their cholinergic deficit, a significant proportion of patients with dementia are exposed to the effects of anticholinergic medications they receive for related diseases. (16, 17) In these conditions, a correct and complete diagnosis is important to prevent both complications, and an inadequate or incorrect treatment. Nevertheless, we are interested in reducing the costs, increase quality of life of patients and decrease the burden of the carer.
Multimorbidity may affect the correct diagnosis including here the time spent in order to make a diagnosis. (18) Thus, multimorbidity affects the duration of hospitalization and the hospital costs. It becomes difficult to find a specific treatment that takes account of contraindications, side effects, and of drug interactions between different substances. Multimorbidity affects not only the evolution of disease but also the patient's functional status and his survival. (19) We summarized these issues in Figure 1.

Figure 1. Multiple effects of multimorbidity

HOW DO WE MEASURE COMORBIDITY?

Comorbidity indices are multi-item predictive indices with three components: a number of items, a severity scale (including criteria) and a scoring system. The differences between various indices of comorbidity are striking. For example, the CIRS (20) and the CCI (21) are summative indices; the KFC (22) and the ICED (23) are ordinal, using the greatest single scores. The score ranges are very different, as are the type of variable and typical distribution of scores. All of these are important factors in choosing an index. To illustrate a number of differences that can guide the clinician to choose a scale, we illustrated in the table 1. below features some of the most important comorbidity index known. (24)

Table 1. Differences

<table>
<thead>
<tr>
<th>Index</th>
<th>Content validity</th>
<th>Face validity</th>
<th>Reliability</th>
<th>Feasibility</th>
<th>Generalizability</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIRS-G</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
</tbody>
</table>
For a more complex understanding of the comorbidity assessment we listed in table 2 a series of comorbidity scales. Paradoxically, given the importance of the phenomenon of comorbidity on prognosis and evolution of a disease, the number of comorbidity instruments is not very high, and the studies of comorbidity and the number of studies on comorbidity is relatively small. Short descriptions were added where information could be found.

### Table 2. Comorbidity Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>Author</th>
<th>Short description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comorbidity Conditions Checklist</td>
<td>C. Melfi, D. Holleman, D. Arthur, B. Katz (27)</td>
<td></td>
</tr>
<tr>
<td>Comorbidity Questionnaire</td>
<td>A. Jablonsky, D. Lawrence (28)</td>
<td>Modified after CCI, the questionnaire has 32 items. It assesses the comorbidity of adult patients with chronic disease, cancer.</td>
</tr>
<tr>
<td>Comorbidity Symptom Scale (CmSS)</td>
<td>H. L. Crabtree, C. S. Gray, A. J. Hildreth, J. E. O'Connell, J Brown (29)</td>
<td>Scale with 23 items which measures the symptoms and their severity in comorbid disorders of old people</td>
</tr>
<tr>
<td>Kaplan–Feinstein Classification, KFC</td>
<td>Kaplan MH, Feinstein AR (15, 30)</td>
<td>Developed in 1974 especially for measuring the comorbidity of patients with diabetes.</td>
</tr>
<tr>
<td>Cumulative Illness Rating Scale</td>
<td>M. W. Linn, B. S. Linn (31)</td>
<td>A scale with 13 items scored from 0 to 4 severity points, developed in 1968. It is a friendly but comprehensive review of medical problems by organ system</td>
</tr>
<tr>
<td>Duke University Severity of Illness Scale (DUSOI)</td>
<td>G. R. Parkerson, Jr., W. E. Broadhead,, C. J. Tse (32)</td>
<td>The scale is used to assess the severity of the problem under management. It is comprised of four components: symptoms, complications, (in the past week) prognosis (next 6 months) and treatability. It is scored from 0 to 4 severity points.</td>
</tr>
<tr>
<td>Functional Comorbidity Index (FCI)</td>
<td>D. L. Groll (33)</td>
<td>Developed in 2005, the scale has 18 items. It is designed to predict the physical functionality of patients who suffered amputations or vascular surgery</td>
</tr>
<tr>
<td>Index of Co-existent</td>
<td></td>
<td>It has a bidimensional structure</td>
</tr>
</tbody>
</table>
Patients with cognitive impairment, especially dementia, commonly suffer from a range of medical comorbidities that contribute to the progression of their cognitive and functional decline. (36) It was noticed an acceleration of cognitive or functional decline after acute episodes of illness (e.g. respiratory or urinary infection) or after surgery. (37) In addition, medical conditions requiring hospitalization can be a significant factor in the progression of a preclinical Alzheimer's dementia into a frank dementia. (38). The mechanisms involved in this process have not yet been elucidated. At the same time the medical comorbidity can be underdiagnosed in the patients with cognitive impairment (39). The duration of hospitalization of patients with significant medical comorbidity is longer, regardless their admission diagnosis. (40) This can affect the patient's cognition and influence the rate of the decline in his health status. Finally, medical costs will be higher. Yet despite its importance, little is known about the comorbidity in dementia; there are very few studies on the prevalence of medical comorbidities in dementia or about its effects on cognition and daily functionality. Furthermore, results of existing studies determined sometimes different conclusions (e.g. Cache County Study, 2004 (41) shows that patients with severe dementia have a greater medical comorbidity while in his study, Sibel Tekin et al. in 2001 (42, 43) found only a minor association between functional impairment in patients with dementia and their associated medical conditions).

This is why, it is extremely important for those involved in the study of these issues to use an appropriate tool for the assessment of medical comorbidities for elderly patients with dementia. The recommended tool for this purpose remains in the opinion of the authors Cumulative Illness Rating Scale For Geriatrics: CIRS-G. In 1992, Miller and collaborators (44) modified the CIRS scale - Cumulative Illness Rating Scale in CIRS-G to adjust the assessment of medical comorbidities in older people. CIRS was initially developed in 1964 to estimate the disease and the survival rate of elderly in a hospital for war veterans. It was subsequently converted into an index for the assessment of comorbidity removing the disease of interest.

As CIRS, CIRS-G scores according to the gravity a number of diseases, organized in 14 categories of systems:
1. HEART,
2. VASCULAR,
3. HEMATOPOIETIC (blood, blood vessels and cells, marrow, spleen, lymphatics),
4. RESPIRATORY (lungs, bronchi, trachea below the larynx),
5. EYES, EARS, NOSE AND THROAT AND LARYNX,
6. UPPER GI (esophagus, stomach, duodenum),
7. LOWER GI (intestines, hernias),
8. MUSCULOSKELETAL (all bones, joints, ligaments, muscles, tendons),
9. NEUROLOGICAL (all parts of the nervous system),
10. DERMATOLOGICAL (all parts of the skin),
11. METABOLIC (all disorders related to carbohydrate, lipid, protein, water and electrolyte metabolism),
12. IMMUNOLOGICAL (all disorders related to immune responses),
13. NEPHROLOGICAL (all disorders related to the kidneys),
14. RESPIRATORY (all disorders related to the respiratory system).

<table>
<thead>
<tr>
<th>Disease (ICED)</th>
<th>S. Greenfield, G. Apolone, et al. (34)</th>
<th>measuring both the severity of the disease and the disability. It has 27 items</th>
</tr>
</thead>
</table>
8. LIVER (including biliary and pancreatic trees),
9. RENAL (kidneys only),
10. GENITOURINARY (ureters, bladder, urethra, prostate, genitals, uterus, ovaries),
11. MUSCULOSKELETAL/INTEGUMENT (muscles, bone and skin),
12. NEUROLOGICAL (brain, spinal cord and nerves),
13. ENDOCRINE/METABOLIC AND BREAST (includes diffuse infections and poisonings),
14. PSYCHIATRIC ILLNESS

Although dementia can be considered a neurological as well as a psychiatric condition, for simplicity it was grouped under "psychiatric conditions" as it's effect on functioning is primarily in this domain. If the dementia stems from multi-infarct dementia or other neurological condition with concomitant neurological signs or symptoms, both "neurologic" and "psychiatric" categories should be endorsed at the appropriate level for severity.

Evaluation of each item of the 14 is granted a severity score from 0 to 4 as follows:

0 - No Problem,
1 - Current mild problem or past significant problem
2 - Moderate disability or morbidity/ requires "first line" therapy
3 - Severe/constant significant disability/ "uncontrollable" chronic problems
4 - Extremely Severe/immediate treatment required/end organ failure/severe impairment in function

Some "arbitrary" decisions were made for categorizing certain conditions that could overlap more than one category and thus be counted twice, e.g., dementia is categorized in psychiatry although it overlaps with neurology, vertigo in the Ear, Nose and Throat category although it could also be in neurology, and CNS vascular lesions are confined to neurology although they technically overlap with "vascular." (13)

The assessment chart of patient will have a total of five main information:
1. total number of disease/diagnostic categories recorded, 2. CIRS-G total score, 3. Severity index (total score/total number of registered diseases), 4. The number of categories with severity level 3, 5. the number of categories with severity level 4 (13)

Summarized, the advantages of CIRS-G scale given by the fact that data can be gathered also from the retrospective analysis of the patient’s medical records. In addition, it required a minimum database, familiarity with MMSE, diagnoses according to DSM III R. The scale shows the levels of severity of each diagnostic category, thus providing a complex picture of the overall health of the patient having an evaluation strategy that allows the reader of the result to notice at first glance if a patient's total score reflects some serious problems or multiple problems of mild to moderate severity, and assesses potential severe problems with 3 and 4 severity scores. Finally, CIRS-G has a manual of guidelines explaining how to make the classification in levels of severity and clear indications of rating for each category (out of 14) in part.

CONCLUSIONS

Medical comorbidity remains a major subject but relatively little studied. There are many difficulties in the conceptualization of comorbidity. Dementia is primarily a disease of older adults and is characterized by progressive decline in
memory and other cognitive abilities. (45) Neuropsychiatric disturbances are common (46) and most patients with dementia due to their advanced age suffer from various concurrent somatic comorbid diseases. (47) Thus, dementia may have a substantial impact on the quality of life and morbidity. (48) Although physical and psychiatric comorbidities are common in younger patients, the combination of these two variables in the elderly and especially in patients with dementia is least documented and poorly understood. Therefore, it becomes imperative to have and apply adequate instruments to assess comorbidity in these patients. Cumulative Illness Rating Scale-CIRS-G can be successfully included among these instruments. It is desirable for the clinical research groups in Romania to use this index in order to get more valuable data in the field of dementia research.

REFERENCES:


