Integrated care of chronic degenerative non-communicable diseases and rehabilitation: the odd couple?

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Chronic degenerative non-communicable diseases affecting different organs and systems are considered by the World Health Organization (WHO) as the emergent epidemic in the third millennium [1]. Congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD) and neurodegenerative disorders are among the most prevalent pathological conditions affecting the aged population of the western world countries. They share multiple risk factors, like smoking, obesity, hypertension, dyslipidemia, and sedentary life-style, among others. They also have common problems and pose gigantic burdens to our health systems including the need for a comprehensive assistance encompassing primary care, specialized assessments, recurrent acute events leading to repeated health resources utilizations such as clinical and instrumental staging of the diseases, emergency room (ER) visits, hospitalizations both in medical wards or in intensive care unit (ICU), pharmacological and non-pharmacological prescriptions. Not to mention the indirect social costs, mainly due to loss of workdays, the burden of caring mainly on the family, and issues related to caregivers.

Clearly, the old paradigms successfully working in the past decades are not suitable for this new epidemic. Primary care alone cannot face this type of overload due to an increasing number of patients, hospitals can only manage the acute phase of the disease; elective clinical and instrumental assessments by themselves are not useful if not to underpin the progression of the disease; pharmacological treatments, at least for some can often only limit the burden of the disease and/or improve symptoms without changing the natural history of many of these devastating disorders.

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As an alternative to the old paradigms, in the recent years a different model of care, an integrated care (IC) model, has been proposed. IC can be designed differently. The common factor of various models of IC is an organizing principle for care delivery improving coordination across and between settings, with the aim to improve patients' experience of services and, at the same time, to reduce health care utilization and consequently costs [2]. Another common point is a pro-active approach: the Health System is not just only reacting to an acute need (*e.g.* an ER visit) but it is actively promoting case-finding, life-style changes, education and self-management and tailored follow-ups. The literature describes experiences of IC based on different approaches.

A workshop of the American Thoracic Society defined integrated care as *the continuum of patient centered services organized as a care delivery value chain for patients with chronic conditions with the goal of achieving the optimal daily functioning and health status for the individual patient and to achieve and maintain the individual's independence and functioning in the community* [3].

Case Management, as an example, is simply based on coordination between different case managers of the patients, particularly in occasion of a transition from a setting to another.

Similarly, *Discharge Management* is providing care to ease the transition usually from the Hospital to home, with a pre-discharge phase planning the future needs of the patient and a post-discharge phase or follow-up in which home and or hospital rehabilitation is playing a role.

The *Chronic Care Model* (CCM) is a more complex approach; it identifies factors to be modified in the healthcare system, such as the organizational support, clinical information systems, delivery system by the care team and follow-up model, decision support based on evidence, self-management support and care coordination in the community-based interventions.

The literature is describing many examples of such programs, in different countries, employing different models in various conditions.

In patients with CHF the three models of IC have been evaluated in several randomized controlled trials. Generally, a reduction in all-cause as well as CHF-specific hospital readmissions have been documented, with the *Disease Management* model that seems to be the most effective [4]. However, concerning the analysis of health-care associated costs, discordant results were obtained. With the limitation of the heterogeneous and often qualitative data that cannot be directly compared across the different reports, most of available reviews reported a reduction in disease related costs (with the *Chronic Care Model* as the most effective in cost reduction), although costs comparable to that of usual care were also reported.

COPD has a high impact on health-care utilization, quality of life and mortality risk. Current treatments from international and national guidelines are focused more on respiratory symptoms than on general condition and comorbidities. Care for COPD patients is also usually fragmented and not well coordinated between different settings. An integrated care with a patient-centered approach is probably the way to

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reduce health care utilization and to improve outcomes, particularly in patients with severe stage of the disease and those with recurrent exacerbations.

Efforts to educate the patient to become more efficient at practices that are involved in self-efficacy are included in programs of self-management targeted to patients with COPD. Promotion of a healthy lifestyle (including smoking cessation, exercise, physical activity and proper nutrition), education on the early recognition and prompt treatment of the exacerbation, and better adherence to the often complex treatment regimen are important part of these programs. However, this type of intervention did not show univocal success in clinical trials [5]. This may at least partly be due to the fact that only a minority of patients is successful in self-management [6]. Added to this is the under-emphasis of care coordination in some self management trials.

The multifaceted nature of Parkinson's disease (PD) naturally lends itself to a multidisciplinary approach to care [7]. Despite the lack of large-scale controlled studies quantifying the effect on multidisciplinary interventions in PD, the advantages of such approach are clear and have been documented in several small studies [8]. With the increasing prevalence and burden of PD, and rising health care costs, the financial implications of such models are even more important. In some European countries like the Netherlands, regional networks providing a particular type of advanced PD therapy [9] have improved both the quality of care and also decreased health care costs [10]. In Germany, a Parkinson network has led to a greatly improved interaction and communication between the movement disorders specialists and the general neurologists, enabling more efficient initiation of advanced therapies. Also intensive multidisciplinary rehabilitation interventions for people with PD have been shown particularly effective at improving quality of life and motor function [11-13].

IC programs usually share some principles. Patients have a unique case- and/or care-manager, who is not necessarily a physician but may be an experienced nurse or other health worker with similar characteristics. All the players are working in team(s) and the care of the patient is not fragmented but rather seen and as – a consequence – managed as a continuum, although in different settings and with different players, depending at which stage or condition the patient is.

Reimbursement may be different as different countries do have different mechanisms for funding the health systems. However, these types of programs usually share a specifically designed type of reimbursements, for example, the annual reimbursement of the Primary Care Physicians in Lombardy Region, Italy (*i.e.* the CReG model, Chronic Related Group).

If different types of IC are the emerging models of care for these patients, how can rehabilitation cope with these changes?

WHO defines rehabilitation as *a process aimed at enabling people with disabilities to reach and maintain their optimal physical, sensory, intellectual, psychological and social functional levels. Rehabilitation provides them with the tools they need to attain independence and self-determination* [14].

Assuming this, who is the target patient for a rehab program today?

Certainly, a target is the patient who suddenly develops an organ-specific disability after an acute event (*e.g.* trauma or surgical intervention, such as a hip replacement surgery). This is the *classic*, maybe even old-fashioned, type of rehabilitation: a type of medical and physical treatment that answers a rather simple question or need, such as the need to *fix* a part of the body that acutely *broke* and to restore its function as much as possible, ideally to the pre-event level.

However, chronic, progressively disabling, disorders require more comprehensive approaches to rehab, seen as an essential part of secondary prevention strategy: cardiac rehab in the progression of CHF with reduced activities of daily life, pulmonary rehab in patients with exercise intolerance and/or respiratory failure, neurological rehab during PD progression.

Due to the complexity of the clinical pictures, and the frequent comorbidities affecting the patients requiring a rather complex and individualized approach, the rehab of chronic disabling disorders seems to represent a truly *prise en charge* of the patient, performing not just a *classic* rehab program – rather limited in its goals – but representing a specialized rehabilitation medicine program (SRMP) of long-term care. This is not limited to the acute phase but also takes into account the different stages of the disease, predisposing patient-tailored follow-up programs including: the evaluation of risk factors and inadequate life-styles, the implementation of educational approaches fostering the awareness of the patients about their conditions, the patient empowerment and self-management, the support to the patients' families and care-givers, the patient and care-giver education to the management of devices, including high-level technological tools (*e.g.* ventricular assisted devices, home mechanical ventilators).

In this context, SRMPs in our view are a basic component of IC or even they represent an essential step in the progression of the disease, a necessary turning point where the patients and their milieu really get acquainted, maybe for the first time, with the complexity and heaviness of their clinical condition but, at the same time, they experience a new way to cope with the disease and, finally, a reliable program addressing many, if not all, of their unmet needs.

From what we stated above, it is clear that we do not really think that IC and rehab are worlds apart. Rather, we think that probably the best way to address and approach the problem associated with the implementation of an IC program for chronic non-communicable diseases inducing disability, is to capitalize on the background and the knowledge and clinical experience that people working in rehab accumulated over the last decades.

With this in mind, it is not surprising that the Maugeri Institute and particularly the Maugeri Rehab Center located in Veruno (NO) started an innovative program of IC for chronic cardiological, pneumological, and neurological disorders. The Program, supported by Piedmont Region, started in 2015 and will last for three years. Briefly, the core program is focused on IC procedures ongoing on inpatients following different SRMP at our Institute. During the individualized rehab program each patient is offered a series of additional procedures such as, for example, individualized assessment of multi-organ component disability, psychological and social support, educational activities delivered with various approaches and case-management/discharge management programs. The integration of clinical, functional and rehabilitation data for each patient is thus creating a comprehensive patient file encompassing all the different dimensions depicting the disability.

Previous data on patients with cardiovascular disability accumulated in our Institute [15] showed that even when performing all these additional and IC types of procedures, the level of disability at discharge correlated with all-cause mortality.

Our aim is to give further details about this concept classifying and following all patients, at least those from Piedmont Region. As for the classification of disability, we will capitalize on the International Classification of Functioning, as recommended by the WHO. The final goal is to identify, among the patients undergoing SRMP, those with a worse prognosis, thus entitled to IC programs.

In addition to this topic, and in agreement with the local health authorities of Novara Province, three cohorts of patients were identified as target of our IC programs: cardiac *fragile* patients, COPD, and PD patients.

At the time of writing of this report, only very preliminary data are available. We can anticipate that, as expected, the different approaches in the three disease-oriented programs are reflected in non-uniform types of patients' responses. While cardiac patients are recruited directly during the rehab programs in our Institute, the other two cohorts of patients are recruited from outpatients, and COPD directly from the general practitioners, who are not under control of our Institute. PD patients are recruited from our clinic and more importantly in a joint venture with patients' association in our area. Not surprisingly thus, cardiac and PD patients have been recruited in significant numbers, while COPD program is still waiting for a real take-off, after 6 months of work.

In conclusion, we, at the Maugeri Institute of Veruno, believe that the experience and the background that we accumulated over the years in curing and caring for patients with many different chronic disabling disorders and relevant comorbidities will guide us to find new ways to deliver an up-to-date, effective and efficient IC program to the patients in our geographical area.

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