European Journal of Internal Medicine xxx (2015) xxx–xxx

Contents lists available at ScienceDirect

European Journal of Internal Medicine

journal homepage: www.elsevier.com/locate/ejim

Review Article

Acute Complex Care Model: An organizational approach for the medical care of hospitalized acute complex patients

Filomena Pietrantonio [a,*], Francesco Orlandini [b], Luca Moriconi [c], Micaela La Regina [b]

[a] UOC Medicina 1. Ospedale S. Eugenio ASL Roma C, Roma, Italy
[b] SC Medicina Interna 1, Ospedale S. Andrea, ASL5 "Spezzino", La Spezia, Italy
[c] Azienda Ospedaliera S. Giovanni-Addolorata, UOC Medicina 1 per l'Urgenza, Roma, Italy

ARTICLE INFO

Article history:
Received 5 May 2015
Received in revised form 17 August 2015
Accepted 18 August 2015
Available online xxxx

Keywords:
Acute medicine
Poly-pathological patients
Internal medicine role
Chronic Care Model
Core competencies in internal medicine

ABSTRACT

Background: Chronic diseases are the major cause of death (59%) and disability worldwide, representing 46% of global disease burden. According to the *Future Hospital Commission of the Royal College of Physicians*, Medical Division (MD) will be responsible for all hospital medical services, from emergency to specialist wards. The Hospital Acute Care Hub will bring together the clinical areas of the MD that focus on the management of acute medical patients. The Chronic Care Model (CCM) places the patient at the center of the care system enhancing the community's social and health support, pathways and structures to keep chronic, frail, poly-pathological people at home or out of the hospital. The management of such patients in the hospital still needs to be solved. Hereby, we propose an innovative model for the management of the hospital's acute complex patients, which is the hospital counterpart of the CCM.

Acute Complex Care Model (ACCM): The target population are acutely ill complex and poly-pathological patients (AICPPs), admitted to hospital and requiring high technology resources. The mission is to improve the management of medical admissions through pre-defined intra-hospital tracks and a global, multidisciplinary, patient-centered approach. The ACCM leader is an internal medicine specialist (IMS) who summarizes health problems, establishes priorities, and restores health balance in AICPPs.

Conclusions: The epidemiological transition leading to a progressive increase in "chronically unstable" and complex patients needing frequent hospital treatment, inevitably enhances the role of hospital IMS in the coordination and delivery of care. ACCM represents a practical response to this epochal change of roles.

1. Introduction

Non-communicable diseases (NCDs) are the major cause of death (59%) and disability worldwide representing 46% of global disease burden [1]. Progressive aging and higher mean age increased the number of subjects affected by chronic, multiple, and complex diseases. Concomitantly, changes in socioeconomics lead to an increase in the number of elderly people with social problems or without family support.

According to the World Health Organization (WHO), the four major NCDs (cardiovascular diseases, cancer, chronic obstructive pulmonary disease, and diabetes) account for nearly 86% of all deaths and 77% of the European disease burden. In Europe, loss of economic productivity as a result of NCDs is significant: for every 10% increase in NCD mortality, economic growth is reduced by 0.5% [2,3].

Current efforts by WHO, aimed to develop a pan-European framework for coordinated and integrated health services delivery, are grounded in the belief that the processes should be aligned to a people-centered philosophy. Accounting for people's holistic needs is an important step in planning and designing of the delivery of health services [4].

The number of frail patients for whom the care of a single pathological episode necessarily requires both a global approach and a close connection with the local health services and social services is progressively growing. The Chronic Care Model (CCM) addresses these changed needs, highlighting patient centricity and enhancing community social and health support, in order to keep chronic, frail, poly-pathological people at home or out of the hospital, providing a social and health care continuum.

The issue of managing frail and complex patients at hospitals still needs to be solved. Nowadays, their care is fragmented in multiple specialized interventions and they often are moved from one ward to another, resulting in a dangerous loss of information and continuity.

To identify a model which ensures an appropriate management of hospital's acute complex patients, a literature review was carried out from December 2014 to April 2015 on the basis of keywords like acute medicine, poly-pathological patients, internal medicine role, chronic care model, core competencies in internal medicine. A total of 101 articles were selected and 26 representative articles were chosen to outline

* Corresponding author at: UOC Medicina 1. Ospedale S. Eugenio ASL Roma C. Piazzale dell'Umanesimo, 10. 00144 Roma, Italy. Tel.: +39 51002542 46; fax: +39 06 51003220.
E-mail address: filomena.pietrantonio@gmail.com (F. Pietrantonio).

http://dx.doi.org/10.1016/j.ejim.2015.08.011
0953-6205/

a new model to improve the management of medical admissions through pre-defined intra-hospital tracks and a global, multidisciplinary, patient-centered approach.

2. The changing face of internal medicine (IM) in the third millennium

A peculiar characteristic of internal medicine wards (IMWs) is their capillary diffusion. In large hospitals, IMWs can express some sub-specialized excellence, thus working as hub centers for regional networks; in small–medium hospitals, IMWs work as medical poly-specialized wards and provide basic care, but also sub-specialized care, ensuring mainly the management of critical patients [5].

2.1. What internal medicine wards do

The activities and attributes of IMWs include [6,7]:

- diagnosis and management of complex, poly-pathological, and frail patients
- provision of basic technological care and filter for sub-specialized and highly technological care
- high functional flexibility from outpatients clinic and hospice to critical or sub-intensive care
- specialized care in internal medicine subcategories
- multi-professional coordination
- co-management of surgical patients by different models, before and after surgery

Tables 1 and 2 list the activities of IMWs and related outpatients clinics.

Internists are considered physicians of "complexity" that means diseases difficult to diagnose and includes multi-morbidity and comorbidity issues in a single patient.

2.2. Core competencies in internal medicine and international management models

The definition of the internist by the *American College of Physician* (ACP) is "doctor's doctor" [8], a specialist that can face complex and difficult clinical cases by giving an order and organizing priorities for the opinions of different specialists. These different specialists use clinical and therapeutic approaches sometimes not compatible with each other, as they neglect the psycho-physical-pathological unit of the patient (linked to the concept of complexity).

A recent study [9] coordinated by the *European Board on Internal Medicine Competencies Working Group* has shown that the practice of IM in Europe is most frequently in hospital settings. The internist is involved in the reform of hospital services aimed at avoiding patients' admissions and reducing length of stay [10]. In response to these changes, internists have taken direct ownership of managing the care of hospitalized patients, which is best illustrated by the development of acute medicine as a distinct specialty in the United Kingdom [11], and similarly by the hospitalist movement in United States [12]. The broad range of knowledge and skills possessed by internists makes them particularly well suited for modern hospital medicine with emphasis on quality and safety, rational use of resources, and cost-effective care [13].

The *Accreditation Council for Graduate Medical Education* (ACGME), the *United States American Board of Internal Medicine* (ABIM) [14], the *Royal College of Physicians and Surgeons of Canada*, the *Joint Royal Colleges of Physicians Training Board* in United Kingdom, and the *European Federation of Internal Medicine* in Europe agree that internists are extending their competencies today not only in terms of medical knowledge but also in terms of soft skills such as procedures, communication, organizational planning, and service management. Table 3 shows examples of procedural skills required to be certified as internist.

Table 1
Internal medicine wards.

Activity	Site and organizational model
Medical admission	High-dependency and ordinary wards
Diagnosis and treatment of acute medical patients	High-dependency and ordinary wards
Short admissions	Ordinary wards
Critical care	High-dependency wards
Treatment of chronic poly-pathological patients (i.e. during exacerbations)	Ordinary wards
Co-management of surgical patients	Structured consultations
Home or residential discharge	Ordinary wards
Hospital at home	Integrated poly-specialist medical team from hospital wards

Table 2
Internal medicine outpatient clinics.

Outpatients areas	Activities
Day hospital Day service	Diagnosis and therapy of poly-pathological and frail patients Special drugs administration Follow-up of discharged patients
Outpatients clinic	Follow-up of discharged patients Diagnosis and treatment of tricky cases Medical exemption certificates and therapy authorization forms Sub-specialist clinics (hypertension, diabetes, hematology, endocrinology, rheumatology, thrombosis, etc.)

2.3. New organizational models in internal medicine

2.3.1. The hospitalist movement

This definition recognizes the organizational model that supports the hospitalist's role, the doctor specialized in hospital medicine, generally an internist [22,23]. As a medical case manager, the hospitalist deals comprehensively with the hospital patient path and facilitates his transition to the community [24–26]. Beyond their clinical work, the hospitalists have become key leaders in quality, patient safety, information technology, palliative care, medical education, and "co-management" of surgical patients [27].

2.3.2. The English model

The recommendations for the future hospital published in 2013 by the Royal College of Physicians [28] explores different issues, from staff standards to relationship with patients, care objectives, good clinical practice, and economic sustainability of health care. They affirm that hospital care should be guaranteed 7 days a week, should be patient-centered with a team of specialists looking after the patient until his clinical conditions require so. Complex patients, in particular, may require more specialists, but all of them coordinated by a consultant, often an internist who will also decide when the patient does not need hospital care anymore, according to pre-defined and simple criteria.

The level of care should be adequate to acuity and complexity of the clinical picture; there should be more space for acute medical patients and the number of nursing staff should be proportioned to the patient clinical needs.

A team of internists should look after all the hospital medical patients, included those in surgical wards with an adequate re-distribution of resources between surgical and medical wards.

Internists training should be comprehensive, including management of frailty and dementia, critical, complex, and comorbid patients and coordination of care.

Please cite this article as: Pietrantonio F, et al, Acute Complex Care Model: An organizational approach for the medical care of hospitalized acute complex patients, Eur J Intern Med (2015), http://dx.doi.org/10.1016/j.ejim.2015.08.011