Intermediate care units in internal medicine: the case of Apulia

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ABSTRACT

Recently, the growing complexity and criticality of patients hospitalized in internal medicine have highlighted the inadequacy of the traditional model based on the "average" standard of care provided to all patients. In this context, intermediate care units (IMCUs) integrated into internal medicine departments have become essential for the management of patients who need a higher level of care than standard patients without requiring intensive care assistance. In Italy, the role of IMCUs in internal medicine was highlighted during the COVID-19 pandemic when many internal medicine units were transformed into COVID areas at different levels of intensity of care. Patients with respiratory failure requiring non-invasive ventilation were managed at the IMCUs coordinated by internal medicine specialists. In Apulia, the debate on the reorganization of internal medicine began many years before the pandemic. In 2012, the regional section of FADOI (Federation of Associations of Hospital Doctors on Internal Medicine) and SIMI (Italian Society of Internal Medicine) had already developed and presented to the regional health department a project for the Apulian internal medicine network in terms of intensity of care. It was only after the COVID-19 pandemic, which involved several internal medicine departments in the region, that the health authorities accepted the proposal to reorganize internal medicine. The Regional Council Resolution No. 1710 of 11/29/2023, Apulia region, ruled in favor of the opening of the IMCUs in internal medicine. Several internal medicine units in the region have adopted this measure, responding to the needs of modern internal medicine.

Introduction

In recent years, patients hospitalized in internal medicine have become increasingly complex and with different degrees of criticality, making it necessary to constantly monitor vital parameters and carry out frequent medical and nursing interventions.[1,2] The patients' complexity intersects with several variables: demographic, health, and social. Population aging, chronic disease burden, loss of family support, and social isolation make elderly patients increasingly frail and with various degrees of disability. In this context, the onset of an acute pathology or the exacerbation of a chronic disease leads to the loss of the fragile balance that allows the elderly patient a

fair amount of autonomy at home and makes hospitalization necessary.

Currently, with few exceptions, Italian hospitals offer two types of care: a unit for stable acute patients and an intensive care unit (ICU). However, patients admitted to internal medicine have clinical problems that require a higher level of care than standard patients without requiring assistance in intensive care. The clinical and health problems of these patients require treatment in special units, defined as "intermediate care units" (IMCUs), "semi-intensive care areas", or "critical areas" which ensure specialized care and careful monitoring.[3,4] IMCUs have been considered a solution to the problem of costs and the limited number of ICU beds, reserving ICU beds only for patients requiring invasive monitoring and organ support, without negatively influencing patient outcomes. These units can be managed with a lower nurse-to-patient ratio and with less need for equipment than ICUs.[5] Patients with stable cardiovascular or respiratory problems (including ventilated patients) and complex, frail, or critical patients, including those transferred from the ICU, are candidates for IMCUs. Different observational studies have demonstrated the efficacy and utility of IMCUs. A recent systematic review analyzed the data from 19 studies carried out in IMCUs in different countries and highlighted several positive effects: reduced nurse-to-patient ratio compared to ICUs; reduction in the need for beds in ICUs; continuity of care between ICUs and patient units; more comfortable hospital environment for patients than ICUs; reduction in hospitalization days compared to patients hospitalized in internal medicine.[6] Historically many IMCUs refer to different medical or surgical specialties (cardiac care, pneumatological care, surgical care for postoperative patients) or are integrated or adjacent to intensive cares.[7,8] The organization and type of IMCUs vary considerably based on the needs of each hospital and the country of reference. In some hospitals, general IMCUs have been created, whereas in others, IMCUs are for specific types of patients (cardiac, respiratory, and surgical patients).[5] Only recently, the growing complexity of patients admitted to internal medicine has made it necessary to establish IMCU areas also in these units.

Internal medicine and a new organization

The Ministerial Decree targeting hospital standards issued in 2015 (MD 70/2015) established that internal medicine departments must be present in all categories of hospitals: basic, first, and second level.[9] In the new model, hospital care should focus on pathologies with acute onset and/or significant functional impairment that cannot be managed in other care settings. This new context gives internal medicine a central role in hospital organizations and requires a renewal of its mission to adapt to the current health policy directions. Indeed, in recent years, the annual reports on hospital admission activity report an increase in the average weight of diagnosis-related groups in internal medicine. Table 1 shows the change in the care burden of hospitalizations in the medical area between 1997 and 2017.[10] These data highlight that, in recent years, patients with acute and serious pathologies have been admitted to internal medicine departments.

In recent years, the epidemiological, demographic, and social transition due to the aging population has led to new

Table 1. Change in the care burden of internal medicine hospitalizations between 1997 and 2017. Reproduced from: Ministry of Health: annual report on hospital admission activity. Data: SDO 1997 and 2017 (10).

	Year 1997- Top 10 medical DRGs (out of a total of acute hospitalizations of 9,369,583)	Number	%
183	Esophagitis, gastroenteritis and miscellaneous digestive system age >17 without complications	206.617	2.2
243	Medical affections of the back	163.296	1.7
127	Heart failure and shock	139.659	1.5
088	Chronic obstructive pulmonary disease	121.395	1.3
134	Hypertension	115.142	1.2
014	Specific cerebrovascular diseases except TIA	106.854	1.1
184	Esophagitis, gastroenteritis and miscellaneous digestive system age <18	95.180	1.0
430	Psychosis	91.010	0.9
324	Urinary stones without complications	87.350	0.9
410	Chemotherapy not associated with secondary diagnosis of acute leukemia	82.054	0.8
	Year 2017 - Top 10 medical DRGs (out of a total of acute hospitalizations of 6,255,055)	**Number**	**%**
127	Heart failure and shock	176.254	2.8
087	Pulmonary edema and respiratory failure	136.590	2.5
014	Intracranial hemorrhage or cerebral infarction	89.097	1.4
089	Pneumonia and pleurisy age > years without complications	81.304	1.3
430	Psychosis	80.629	1.3
316	Renal failure	75.359	1.2
576	Septicemia without mechanical ventilation, age >17 years	71.754	1.1
125	Cardiovascular diseases, except AMI, with cardiac catheterization and uncomplicated diagnosis	64.827	1.1
183	Esophagitis, gastroenteritis and miscellaneous digestive system diseases age <18	50.543	0.8
410	Chemotherapy not associated with secondary diagnosis of acute leukemia	45.877	0.7

DRGs, diagnosis related groups; TIA, transient ischemic attach; AMI, acute myocardial infarction.

healthcare needs with greater demand for hospital admissions. Elderly patients with multiple pathologies, various degrees of disability, cognitive disorders, and social frailty are mainly hospitalized in internal medicine departments as emergency hospitalizations.[11] In Italy, internists manage approximately 39,000 beds, carrying out more than 1 million hospitalizations/year in 1060 internal medicine departments. A study that analyzed 2013 SDO data highlighted that 83% of internal medicine admissions come from the emergency room and are mostly elderly. Internal medicine departments present 60% of patients over 75 admitted *via* emergency.[12] These data underline the crucial role of internal medicine in the management of acute conditions and in the ability to reduce overcrowding in emergency rooms with constant bed supply. A recent multicenter study carried out in the internal medicine department in the Lombardy region (Italy) demonstrated that more than half of the patients have moderate to severe complexity, and 15% are at risk of clinical instability during hospitalization.[1] To face this challenge, it has become necessary to overcome the traditional model of care based on the "average" standard of care provided to all patients admitted to internal medicine and move to a system differentiated by intensity of care.[13]

Several recent studies have reported positive outcomes with the introduction of the "intensity of care model" in internal medicine, obtaining an improvement in clinical outcomes, reduction of transfers to intensive care, and better use of intensive care beds.[14,15] The attitude of internal medicine specialists to maintain a holistic and "patient-centered" approach even in emergency situations may have contributed to the positive results recorded in the various contexts that have adopted the intensity of care model.

The role of internal medicine in the management of critically ill patients has emerged during the COVID-19 pandemic, in 2020-2021. The impact of the pandemic, in terms of hospitalizations and the need for intensive and semi-intensive care, as well as home care, has put the national healthcare system to the test. In this context, it was immediately necessary to involve the internal medicine units to deal with the request for hospitalization of patients suffering from SARS-CoV-2 infection without the need for intensive care. SARS infection can be considered an internal medicine disease because of protean manifestations. Respiratory failure with the need for ventilatory assistance, renal failure, thrombosis, cardiac involvement, and gastrointestinal disorders are conditions well-known to internal medicine specialists.[16] In a very short time (even 24-48 hours), the internal medicine departments became COVID areas, and IMCUs were created for patients with respiratory failure who needed non-invasive ventilation.[17,18] In these areas, the patients with SARS-CoV-2 pneumoniae underwent continuous multiparametric monitoring, non-invasive ventilation or high-flow oxygen therapy, and adequate medical and nursing care.

The increase in the number of beds in internal medicine and the creation of sub-intensive care areas with adequate instrumentation were possible thanks to Decree Law of 9 March 2020, which provided for the creation of 4225 sub-intensive care beds to be allocated mainly in internal medicine departments.[19] A survey promoted by the FADOI Research Center (Federation of Associations of Hospital Doctors on Internal Medicine) in November 2020 showed that the internal medicine wards managed around 70% of SARS-CoV-2 patients.[20]

The experience of the COVID-19 pandemic demonstrated the great resilience and flexibility of internal medicine and brought attention back to the organizational model with areas at different levels of care.

The two Italian Scientific Society of Internal Medicine, FADOI and SIMI (Italian Society of Internal Medicine), driven by the changes brought about by the COVID-19 pandemic, have presented a document to the national health authorities requesting "the issuing of a national ministerial regulation, which defines precise organizational criteria... to allow correct and homogeneous implementation of the critical areas of semi-intensive therapy of internal medicine throughout the national territory".[21]

The case of Apulia

The model of reorganization of internal medicine departments in Apulia has been a subject of interest and wide debate within the regional sections of FADOI and SIMI. In 2012, the two societies had already developed and presented to the regional health department a "Redevelopment project for the Apulian Internal Medicine network in terms of intensity of care".[22] The project involved the integration of three care areas: ordinary acute hospitalization area, semi-intensive critical care area integrated into the emergency-urgency network, and post-acute long-term care area integrated with the network of local services.

This plan was followed by the institution of a Technical Table as a forum for discussion between the regional institution and the two scientific societies with the aim of developing operational proposals for the activation of the critical area in internal medicine.[23] Unfortunately, the work of the Technical Table did not lead to the adoption of official deliberative acts by the regional institution and, consequently, did not bring about changes to the organization of the internal medicine departments.

However, the Regional Regulation of 22 November 2019, No. 23 on "Hospital Reorganization in the Apulia region" provided for the activation of beds for critical patients in internal medicine departments without defining the organizational criteria.[24]

The activation of a critical area in internal medicine involves a great change in the organization of the department and requires a strong will from the medical management. Creating a high-quality clinical environment requires a healthcare team with critical care expertise. The German Interdisciplinary Association of Intensive Care and Emergency Medicine recommends that at least 20% of nurses in the whole team should have training in intensive care.[4] These assessments acted as a brake on the activation of the critical internal medicine area in several Apulian hospitals. However, there were operational units animated by an innovative spirit that accepted the challenge and activated critical area beds. A project for the creation of the critical area was started at the Internal Medicine of the Cerignola Hospital (Foggia) in 2012, 8 years before the COVID-19 pandemic.[3] A similar experience was implemented in the Geriatrics Department of the IRCCS Ecclesiastical Hospital of S. Giovanni Rotondo (Foggia).[25] These pioneering experiences, as well as the relevant literature, were the basis of the recommendation document drawn up by the Technical Table working group established in 2014, which clearly outlined the organizational standard and the instrumental and personnel equipment necessary for the critical area of internal medicine.

Table 2. Intermediate care unit area equipment and instrument list.

Instrumental equipment for each bed
Continuous multiparametric monitoring
Non-invasive ventilation equipment
High-flow oxygen administration
A high-pressure, high-flow O_2 outlet
A vacuum socket with connected aspirator
Infusion and injection pumps
Anti-decubitus devices
Alert system, a light source and at least six power sockets
Instrumental equipment for the IMCU area
Ultrasound machine with linear, convex and cardiological probe for point-of-care ultrasound
Defibrillator
A bed with hemodialysis ports
Blood gas analyzer

IMCU, intermediate care unit.

During the COVID-19 pandemic, several internal medicine departments in the Apulia region were organized into sub-intensive areas for patients with severe SARS-Cov-2 pneumoniae and equipped with continuous multiparametric monitoring, non-invasive ventilatory support, high-flow nasal cannula, ultrasound systems for bedside ultrasound, and a blood gas meter.[26]

The positive results of this integrated management model at multiple levels of intensity have reopened the debate on the reorganization of care in internal medicine. The regional section of FADOI has reworked and produced a new document on the reorganization of the internal medicine units (2023) and has presented this document to the regional health authorities ("Proposal for the reorganization of the Internal Medicine Operational Units by FADOI PUGLIA 2023").[27] The reorganization of internal medicine by levels of intensity of care involves, as previously indicated, the integration of three areas: i) ordinary acute hospitalization area: *e.g.*, 24 ordinary acute hospitalization beds integrated into the hospital network; ii) critical area of sub-intensive care (code 94): 4-6 beds of critical area of semi-intensive care integrated into the emergency-urgency network; iii) post-acute long-term care area: *e.g.*, 10 beds integrated with the network of local health services (code 60).

The document reiterates that the availability of a higher-intensity treatment area responds to the mission of internal medicine, which also addresses critical issues with a holistic and patient-centered approach. The paper defines the admission criteria, personnel, and technical equipment for the critical area. The nurse-patient ratio should be at least 1:4, and the continuous presence of a physician is required (it could be organized in the form of interdivisional on-call for nights and weekends with doctors of similar disciplines). The equipment and instruments given in Table 2 should be available.

The reiteration of the proposal and the changed epidemiological and health scenario of Apulia have fostered the attention of the Health Department on the organizational model proposed by FADOI. This interest led to the Regional Council Resolution No. 1710 of 11/29/2023, Apulia region, "Project for the reorganization of the Internal Medicine Operating Units, as per FADOI proposal".[28]

To implement the provision, a Technical Table was set up, composed of representatives of Apulia FADOI, managers of the A.Re.S.S (Regional Agency for Health and Social Care), and health directors of the companies of the Regional Health Service. In June 2024, the Technical Committee ruled in favor of the opening of the critical area in internal medicine, leaving full autonomy to individual Health Authorities regarding the implementation methods.

The reorganization of the internal medicine departments by intensity of care, approved with the Resolution of the Regional Council of Apulia 1710/2023, was the subject of discussion and study in a special session of the Mediterranean Forum in Healthcare, held in Bari on 20 September 2024, with the active participation of national and regional health and political authorities, the directors of the internal medicine departments of Apulia and the National Executive Council of the FADOI.

The regional resolution is bringing the expected innovations; in February 2025, the Internal Medicine of Andria Hospital activated the IMCU area for critical patients, and similar initiatives are planned in other regional hospitals.

Conclusions

The effectiveness of using critical areas in internal medicine for the treatment of critically ill patients who do not require traditional intensive care has been established. For years, a change has been underway in the organization of internal medicine to meet the challenge of new epidemiological scenarios.

The traditional idea of internal medicine as a low-intensity specialty no longer responds to reality. Real-world data shows that patients with a high degree of complexity and care burden are admitted to medical wards. It is therefore necessary to reorganize the hospital medical areas by enhancing the transversal skills of internal medicine, which range from the management of critically ill patients to the multidimensional evaluation of fragile and multi-pathological patients. The process of implementing this new model is neither simple nor immediate. This work retraces the long regulatory process that

allowed the approval by the Apulia Region Health Authority of the new organizational model of internal medicine proposed by FADOI. The resilience of internist physicians has overcome technical and regulatory difficulties.

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