

A snapshot of geriatric rehabilitation: one year experience

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Abstract. – OBJECTIVE: Frailty is a common condition in older adults, characterized by multimorbidity, physical weakness and nutritional deficit. Frailty can be detected early and a prehabilitation treatment could reduce the incidence of disability.

PATIENTS AND METHODS: Two-hundred-fifteen elderly patients were admitted to the Rehabilitation and Physical Medicine Unit of Policlinico Gemelli for one year. Patients were clinically assessed by Charlson Comorbidity Index (CCI) and blood sample values. Numerical Pain Rating Scale (NRS) and Hand Grip Test were assessed before (T0) and after (T1) hospitalization. Number of drugs and number of infections were recorded.

RESULTS: Patients were originally hospitalized in orthopaedic, neurology and medical ward. Most patients (68%) after discharge return home. Negative correlations between albumin and CCI and between total protein and CCI were recorded. Positive correlation between CCI cognitive subscore and number of drugs and a negative correlation between that subscore and Vitamin D were detected. An improvement in NRS and in the handgrip strength was recorded. At discharge an increase in the number of drugs and the number of infections was noted.

CONCLUSIONS: The handgrip strength improvement increases quality of life. Pain management and NRS indicate a better recovery of activities of daily living. Malnutrition is a real problem; albumin is the principal negative acute-phase reactant and is related to a worse clinical condition and low vitamin D levels are associated with worse cognitive function. The goal of a Rehabilitation Unit is to create an effective multidisciplinary transitional care plan, involving the patient and caregivers, creating a continuity of care after discharge and a sustainable project.

Key Words:

Frailty, Older adults, Rehabilitation, Continuity of care, Personalized medicine.

Introduction

Life expectancy has increased in recent decades, and most people worldwide can live beyond 60 years¹. As age increases, comorbidity, risk of frailty and disability increase^{2,3}. Chronic diseases contribute to the development of frailty⁴, through a progressive accumulation of biological deficits over the years. Therefore, pathologies contribute substantially to multimorbidity, especially in older patients. In fact, over age 65, 55-98% of the elderly are affected by multimorbidity⁵. Frailty is defined as a clinical state characterized by an increased vulnerability of an organism to stressors, exposing individuals to negative health-related outcomes⁶. Several definitions of frailty have been proposed in recent decades. However, a global consensus about the definition has not yet been reached. One of the most widely used definitions is the Frailty Index (FI), which characterizes frailty by a multidimensional analysis⁷. This type of assessment provides quantitative and objective information about the deficits that a person accumulates with aging⁸. In general, frailty is a common phenomenon in old age. Prevalence ranges from 4 to 59%, although the data depend primarily on the type of measure used to assess frailty and the setting⁹. Frailty is considered a risk factor for the development of disability^{10,11}. Often frailty and

disability can coexist together, especially in older adults. Disability is similarly an umbrella term for impairments, activity limitations, and participation restrictions¹². Generally, having a disability means having reduced functional independence. This has implications for multiple aspects: reduced quality of life, risk of institutionalization, hospitalization, and mortality¹³⁻¹⁶. Frailty can be detected early, and treatment can be initiated to potentially reduce the incidence of disability. The purpose of rehabilitation is to attempt to restore mental or physical function that has been lost or diminished by disease, injury, or other causes. The goal is to restore the best level of autonomy and independence. Although rehabilitation is available to everyone, the elderly population is generally more impacted by disability. This paper is intended as an overview of our experience in the rehabilitation department and the reintegration of the rehabilitated patient at the end of the rehabilitation process.

Patients and Methods

Sample and General Assessment

This is a retrospective observational study, all inpatients admitted to the Rehabilitation and Physical Medicine Unit of the Fondazione Policlinico Universitario Agostino Gemelli IRCCS in Rome (Italy) were included in the data collection. Between November 2020 and November 2021, 215 patients (mean age: 72.26±14.14 years; 94 men, 121 women) were admitted to the considerate Hospital Unit. The study was performed in accordance with the Declaration of Helsinki. All participants provided written informed consent before participation.

Demographic, anamnestic, and clinical data were recorded during the hospitalization. In particular, the patients were clinically assessed when admitted (T0) by the Charlson Comorbidity Index (CCI) and blood sample values were collected: hemoglobin (Hb), white blood cells, platelet, neutrophils, lymphocytes, platelet/lymphocytes ratio, neutrophils/lymphocytes ratio, vitamin D, albumin, total protein, C Reactive Protein (CRP), procalcitonin. To assess the nutritional status of inpatients albumin and total protein were considered. The CCI is a tool that categorizes comorbidities and quantifies an individual's disease burden. It includes a sub score related to cognitive impairment of the subjects. CCI has been associated with one-year mortality risk. Moreover, patients

were clinically evaluated at the beginning (T0) and at the end (T1) of hospitalization by the Numerical Pain Rating Scale (NRS) and the Hand Grip Test. Finally, in the same time points (T0 and T1), number of drugs administered to patients and number of infections were recorded.

The demographic, anamnestic and clinical characteristics of the sample were shown in Table I.

Statistical Analysis

For statistical analyses, the significance was set at p -value <0.05 and IBM SPSS Statistics for Windows, Version 20.0 (IBM Corp Released 2011; Armonk, NY, USA) was used. The Shapiro-Wilk probability test was used to assess the normality of the distributions. The Wilcoxon Signed Rank non-parametric test was used to compare each data recorded at T0 and T1. Spearman correlation test was used to evaluate relationship between data on nutrition, infection, and cognitive aspects.

Results

Elderly patients admitted to the Rehabilitation and Physical Medicine Unit originally came for different hospital wards. However, all these conditions required intensive inpatient rehabilitation. Rehabilitation for these circumstances begins in the acute care unit, but intensive rehabilitation is often required. In our experience, these elderly patients are often clinically complex and frail physically, nutritionally and socially. Because of these factors, home-based rehabilitation at their own homes has not been possible. We can analyze our findings considering the pathologies affecting the inpatients considered in the present study.

Disorders of the Musculoskeletal System

The most frequent Unit of provenance was the orthopedics ward, from which 49.3% of patients came. These patients primarily presented with musculoskeletal issues. One of the most frequent conditions was a hip fracture. This type of condition is very common in elderly subjects and contributes significantly to the mortality and morbidity of these patients^{17,18}. Initial rehabilitation included early mobilization, especially to prevent deep vein thrombosis and deconditioning. Thereafter, the weight loaded on the limb was always reduced and progressively increased based on recovery. A hip fracture can cause a significant deficit in functional autonomy, causing difficulties in even the most basic activities of daily living. Basic

activities such as dressing, moving from bed, going to the bathroom, require mobility and flexibility of the lower limbs, which is lacking after a hip fracture. Very often in elderly subjects, this event occurs as a result of a fall. These patients were treated with physical therapy, occupational therapy and, when possible, with technological means, thanks to the presence of a multidisciplinary team created to improve the rehabilitation outcome. In addition, these patients often had minimal cognitive deficits as well. Cognitive deficits can slow recovery¹⁹. However, rehabilitation can have benefits on cognitive deficits as well. The presence of the geriatrician physician on the multidisciplinary team has also helped assess the type of rehabilitation goals and any services that may be helpful in recovery²⁰. Another very frequent issue is disability consequent to elective hip or knee replacement. Generally, this type of surgery is often performed in advanced cases of osteoarthritis. Osteoarthritis is the leading cause of mobility problems in the older adults. Once again, patients were treated through the involvement of a multidisciplinary team. Patients with osteoarthritis of the hip or knee are frequently overweight. An example of a multidisciplinary intervention, between the physician, nutritionist, and other health care professionals, is the drafting of a dietary plan tailored to the patient's needs and comorbidities. In addition, these patients may have sarcopenia and frailty. During their stay in the ward, patients were monitored nutritionally, particularly protein and vitamin D intake, and assured of adequate analgesia.

Neurological Disorders

Thirty-four percent of our rehabilitation patients come for neurological issues. Specifically, the Unit of origin was neurology, stroke unit, spinal surgery, or neurorehabilitation. One of the leading causes of entry into rehab for neurological disorders is stroke. When possible, it is appropriate to start rehabilitation early²¹. Rehabilitation can begin as late as 24-48 hours after the event if the patient is clinically stable. These patients must be able to tolerate intensive rehabilitation, which involves at least three hours of therapy per day. Adherence to therapy will be critical to functional recovery. Functional recovery after a stroke can be very complex and varied. Depending on the area of the brain affected, different systems may be affected, such as vision, strength, coordination, speech, and balance. Especially in these patients, the intervention of a multidisciplinary team is essential. One of the most frequent problems is

Table I. Characteristics of the sample.

	n (%) Mean±SD
<i>Patients</i>	215
<i>Gender. Male/Female</i>	94 (43.7)/121 (56.3)
<i>Age</i>	72.26±14.14
<i>BMI</i>	25.7±5.3
<i>CCI</i>	6±3
<i>Days of hospitalization</i>	22±10

BMI – Body Mass Index; CCI – Charlson Comorbidity Index.

dysphagia. Furthermore, these patients are often at risk for malnutrition. These interventions are focused on functional recovery through compensation strategies and cognitive training. Interventions aimed at reducing the risk of a second stroke or stroke complications are also performed. Particularly important, during the period of intensive rehabilitation, is the psychological support. This component is ensured, when possible, by the support of family members and expert figures.

Another frequent neurological disorder is parkinsonism. Parkinsonism is a spectrum of disorders with a slow and progressive character. Generally, physical therapy confers only modest benefits and is often only temporary²². However, interventions are needed to treat motor deconditioning and teach compensation strategies. Again, a multidisciplinary team works to treat these patients, primarily through physical and occupational therapy^{23,24}. Often these patients also present with speech problems, so speech therapy is also performed²⁵⁻²⁷. Generally, hypophonia and dysarthria are among the most common problems and can affect the quality of life outside the hospital.

Approximately 2% of patients came after spinal surgery. Recovery following an acute spinal injury can be complex to manage. It requires the intervention of several individuals, such as the rehabilitation specialist, physical therapist, occupational therapist, and nurse. Such patients often present with physiological complications related to the injury, as well as muscle weakness, reduced autonomy, and mobility²⁸.

Deconditioning and Sarcopenia

Sixteen percent of patients came from a medical ward. Most of these patients were medically admitted to an acute care unit, had become debilitated and bedridden by an acute event. As a result, these patients developed motor deconditioning and exacerbated sarcopenia. Sarcopenia

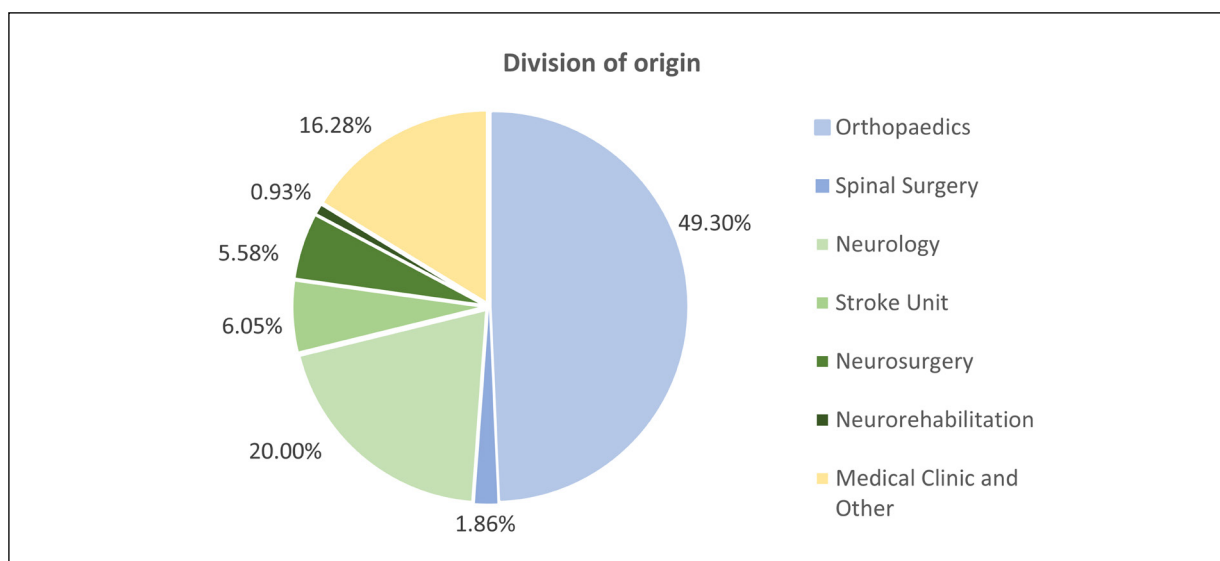


Figure 1. Patients' classification according to the ward of origin, the percentage of each department is reported.

nia is a well-recognized event primarily related to aging. However, some situations, such as an acute disease or worsening of a chronic condition, can be the cause of decreased physical activity or deconditioning. This can cause loss of muscle mass and strength. Through exercise and proper nutritional support, you can attempt to improve this condition.

The patients admitted to the Rehabilitation and Physical Medicine Unit were classified according to the ward of origin (Figure 1) and according to the final structure decided in their discharge (Figure 2a). Moreover, in detail were analyzed the two final structure classes: "facility" and "home" (Figure 2b and 2c).

Our patients were discharged to their homes or another facility. Sixty-eight percent of patients were discharged at home, while the remaining 32% required further hospitalization. Of the latter, 42% needed to be admitted to a hospital ward. Within this group, the average number of days of hospitalization was 19.9 ± 9.6 days. Table II shows the hospital ward of discharge.

The discharge wards involved were the COVID-19 ward, the ward for the bed blockers, radiotherapy ward, surgery ward, and other medical wards. Patients who were admitted to the COVID-19 ward discontinued their hospitalization early, as respiratory isolation was required. Patients who were discharged to the radiation therapy ward were admitted for prehabilitation treatment before starting radiotherapy. Patients who were then admitted to the surgical wards per-

formed prehab before doing surgery (spinal surgery, arthroplasty, skin grafting, pacemaker placement). Patients who were admitted to a medical ward had the onset of a new condition or an exacerbation of a previous condition. As for patients who were discharged at home, 90% of them had achieved good self-sufficiency and a good degree of functional recovery. This recovery, achieved through a course of intensive multicomponent-intervention rehabilitation, allowed them to return to their homes without the need for further rehabilitation. However, ten percent of these patients required the activation of one or more territorial services available in the Rome area. Five percent of these patients continued their outpatient rehabilitation at the physical medicine day-hospital, where physical exercise and/or occupational therapy activities were planned. Four percent of these patients continued with three-weekly home rehabilitation, where physical exercise was conducted by expert personnel at the patient's home. Finally, one percent of these patients required hospitalization in a medical ward.

Table III shows the correlations between data on nutrition, infection, and cognitive aspects.

Analyzing the patients' data on nutrition aspect during the hospitalization we found negative correlation both between albumin and CCI ($p < 0.001$, $\rho = -0.289$) and between total protein and CCI ($p < 0.001$, $\rho = -0.297$); also, there was a negative correlation between, albumin and number of infection ($p = 0.001$, $\rho = -0.232$), albumin and number of drugs at baseline (T0) ($p = 0.009$, $\rho = -0.189$)

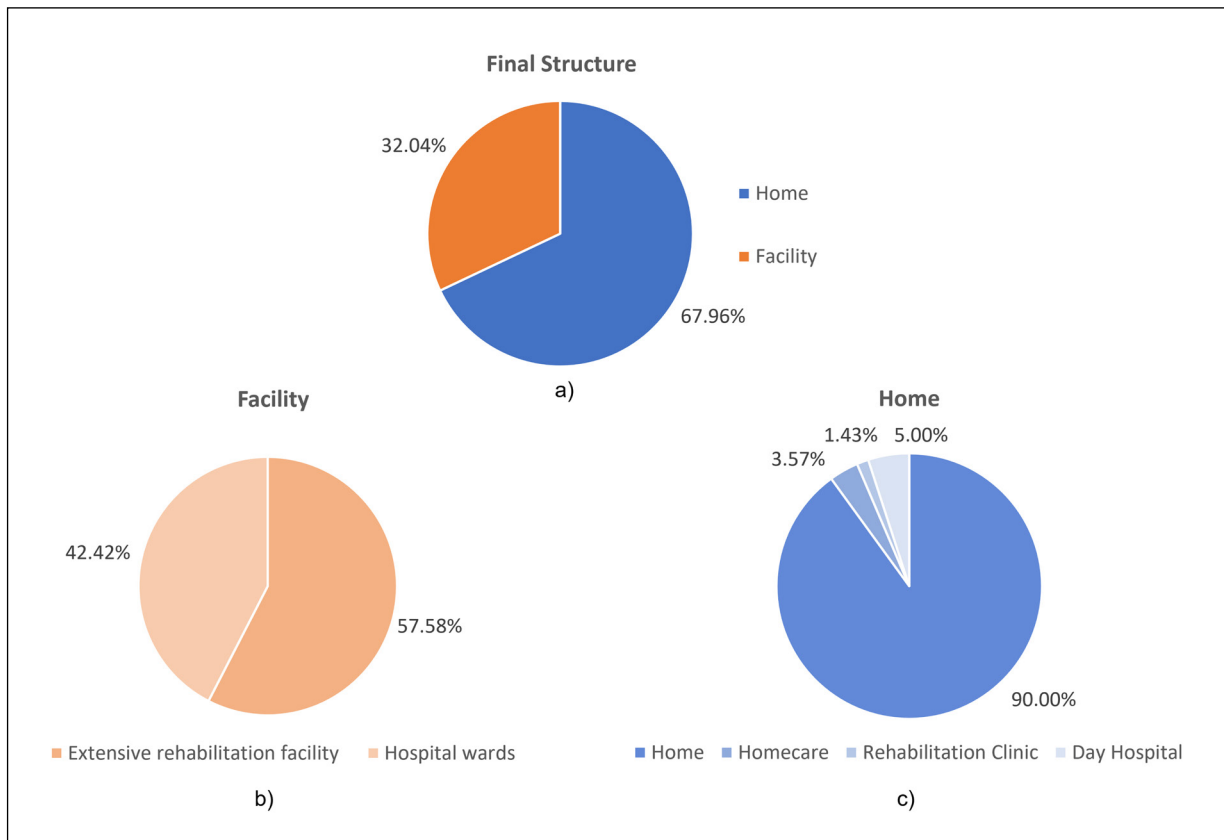


Figure 2. **a**, at the top, our patients were discharged at home or in a facility; 68% of them were discharged at home while 32% were discharged to a medical facility. **b**, at the bottom left, amongst the patients discharged in a facility structure, 42% went on an extensive rehabilitation facility and 58% went on a hospital ward. **c**, at the bottom right, amongst the patients discharged at home, 90% had fully recovered without the need for further rehabilitation while 10% of patients needed an outpatient/home-based rehabilitation.

and at discharge (T1) ($p = 0.004$, $\rho = -0.206$) and total protein and number of drugs at T1 ($p = 0.006$, $\rho = -0.198$).

Regarding the infection aspect we found a positive correlation both between CRP and number of infections ($p = 0.002$, $\rho = 0.241$) and between procalcitonin and number of infections ($p = 0.001$, $\rho = 0.447$); also, there was a positive correlation between CRP and CCI ($p = 0.002$, $\rho = 0.234$). Finally, days of hospitalization correlated positively with CCI ($p = 0.018$, $\rho = 0.164$) and number of infections ($p < 0.001$, $\rho = 0.246$).

Concerning cognitive aspects, we found a positive correlation between the CCI cognitive problems subscore and number of drugs at T0 and T1 ($p = 0.002$, $\rho = 0.211$ and $p = 0.001$, $\rho = 0.238$, respectively) and a negative correlation between the same subscore and Vitamin D ($p = 0.038$, $\rho = -0.174$).

Finally, when we compared data recorded at baseline (T0) and at the discharge (T1), statistically significant changes in NRS ($p < 0.001$) and in the handgrip strength ($p < 0.001$) were detected, so patients improved in pain and strength. At the

Table II. Hospital Unit of discharged.

Hospital ward of discharge	No. of patients	Length of stay in our clinic (days of hospitalization)
<i>COVID-19 ward</i>	3	19±7.5
<i>Ward for the bed blockers</i>	4	23±18.5
<i>Radiotherapy ward</i>	2	27.5±9.2
<i>Surgery ward</i>	5	19.2±4
<i>Other medical ward</i>	14	18.1±8.6

Table III. Correlation between data on nutrition, infection, and cognitive aspects. Spearman correlation coefficient and p-value are reported.

	Variables	CCI	Number of Infections	Number of drugs T0	Number of drugs T1	Vitamin D
<i>Nutrition</i>	Albumin	-0.289 (<0.001)	-0.232 (0.001)	-0.189 (0.009)	-0.206 (0.004)	-0.089 (0.301)
	Total Protein	-0.297 (<0.001)	-0.137 (0.057)	-0.073 (0.311)	-0.198 (0.006)	-0.061 (0.480)
<i>Infection</i>	CRP	0.234 (0.002)	0.241 (0.002)	0.089 (0.255)	0.093 (0.238)	0.002 (0.985)
	Procalcitonin	0.213 (0.122)	0.447 (0.001)	0.047 (0.739)	-0.184 (0.193)	0.016 (0.927)
	Days of hospitalization	0.164 (0.018)	0.246 (<0.001)	-0.029 (0.683)	0.011 (0.874)	0.044 (0.602)
<i>Other</i>	NRS T0	0.041 (0.558)	0.145 (0.036)	0.112 0.107	0.178 0.010	0.175 (0.036)
	NRS T1	0.113 (0.107)	0.145 (0.038)	0.169 (0.015)	0.284 (<0.001)	0.139 (0.101)
	BMI	-0.011 (0.876)	0.046 (0.509)	0.230 (0.001)	0.193 (0.006)	0.059 (0.482)
	CCI Cognitive problem		0.070 (0.312)	0.211 (0.002)	0.238 (0.001)	-0.174 (0.038)

CRP – C Reactive Protein; NRS – Numerical Rating Scale; BMI – Body Mass Index; CCI – Charlson Comorbidity Index.

same time, however, there was a statistically significant increase in the number of drugs and the number of infections at the end of the hospitalization ($p=0.009$ and $p<0.001$, respectively) (Table IV). The total number of infections that the overall patient population had at the beginning of hospitalization was forty-one. At the end of the hospitalization, the number was 88. Hence, for the entire observation period there were 47 infections.

Discussion

In our department we managed mainly elderly patients who had a high number of comorbidities and high complexity and had recently experienced an adverse event, such as a hip fracture or stroke. Management of these patients begins from the moment they arrive on the ward. A group of healthcare professionals work cooperatively and discuss a personalized plan for rehabilitation and discharge. Our goal was to develop a personalized rehabilitation plan to improve some aspects of the older adult's life, such as mobility and physical performance^{29,30}. Such a rehabilitation plan arises with a focus on managing those factors most associated with effective rehabilitation, such as comorbidities, caregiver cooperation, physical func-

tion, and nutritional status³¹. To be effective, a transitional care plan must also involve the patient and his or her relatives. Through dialogue and discussion, they try together to figure out where the patient is going after the rehabilitation period is over. Part of this includes having in-person or phone meetings with the patient's family members. In addition, at the end of the patient's stay in the unit, a document is issued to the patient with guidance on any behavioral and therapeutic recommendations. For more complex cases where it has been necessary to activate territorial services, we have collaborated with the Transitional Care Unit of our Hospital³². In this way, it was possible to activate services provided by our region that could help the patient to have an adequate continuation of care at home. The goal was to create an effective transitional care plan, involving the patient and family members, creating a continuity of care after discharge and a sustainable project³³.

Handgrip and Muscle Strength

Compared with the time they began rehabilitation, patients gained improved handgrip strength (HGS). During inpatient days, patients performed physical exercises that improved their physical performance. HGS is a predictor of cognitive and functional decline, mobility, mental health, and

Table IV. Clinical data values (medians and interquartile ranges) at T0 and T1 and statistical analysis results (T0 vs. T1 evaluation).

	Baseline Median (IQR)	Discharge Median (IQR)	p-value
<i>Number of drugs</i>	7 (5-10)	9 (7-12)	0.009
<i>NRS</i>	2 (0-4)	0 (0-2)	< .001
<i>Number of infections</i>	41	88	< .001
<i>Handgrip</i>	16 (10-25)	19 (13-27)	< .001

NRS – Numerical Rating Scale for Pain Assessment.

mortality in community-dwelling older adults^{34,35}. It has already been seen that older adults who have low HGS also have lower levels of activities of daily living and instrumental activities of daily living³⁶. A low HGS value would also seem to be correlated with cognitive decline, in a Mini-Mental Status Examination and Digit Symbol Substitution Test reduction³⁷. HGS levels would also be inversely correlated with mental health as well³⁸. A higher level of HGS would result in a reduced risk of stress and mood alterations. In addition, measurement of HGS may also contribute to the assessment of nutritional status³⁹. This improvement, achieved during rehabilitation, could contribute to an improvement in the patient’s quality of life. However, we have no information on whether there is a long-term benefit in our patients as a result of this improvement. In addition, a follow-up was absent after hospitalization. Therefore, we do not have data on the maintenance of this increase in handgrip strength obtained during rehabilitation.

Pain and Pharmacological Interventions

Pain, as measured by the NRS, was greater at baseline and improved at the end of hospitalization. This outcome results in a better quality of recovery of activities of daily living and may also be a negative prognostic factor for institutionalized older adults⁴⁰. Pain limits the resumption of activities of daily living and can also be a negative prognostic factor for institutionalized older adults⁴¹. Pain relief and increased medication are often related. However, physician should carefully consider polypharmacy due to multimorbidity in older patients⁴². Although one of the main attentions of the geriatrician is toward deprescribing, in some cases it is important to add medications, when necessary, even for the shortest possible time (e.g., symptom control). These prescribed medications are analgesics and can improve the patient’s physical function and quality of life. Moreover, pain control can reduce the risk

of adverse events such as the onset of delirium. This is especially true in patients who have undergone surgery, such as for hip fracture, orthopedic prostheses, or spine surgery. However, other medications, such as those for antithrombotic prophylaxis, that are prescribed for limited periods also result in the number of medications at discharge. Theoretically, some of the medications that result at discharge, therefore, should have been discontinued by patients as prescribed. However, because we did not follow up on these patients, we do not know whether they followed the indications. The number of medications increases to manage a patient who has become more complex than before the acute event. However, by creating a noncomplex therapy pattern, patients have a higher probability of returning home⁴³. During rehabilitation, we did a review of each patient’s medications, attempting to discontinue or limit the use of potentially dangerous ones (e.g., benzodiazepines, anticholinergics, opioids). This has been done to highlight and eliminate potentially inappropriate medications that may cause adverse outcomes, falls, and death⁴⁴. Common screening methods such as the Beers criteria were used.

Nutrition

Malnutrition is a major problem, especially in the elderly population^{45,46}. Albumin is often used as a marker of nutritional status. Albumin is the principal negative acute phase reactant; its level decreases in response to acute inflammatory clinical conditions or chronic systemic diseases. Serum protein levels, including albumin, correlate inversely with CCI. Low albumin levels are often found in patients who have sustained a femur fracture⁴⁷. Furthermore, it has been proposed as a marker of slow recovery after a major event such as a femur fracture⁴⁸. In addition, low albumin levels are associated with increased mortality from multiple causes, including coronary artery disease, renal disease, and femur fracture⁴⁹⁻⁵¹. During hospitalization, patients began a diet with

increased protein intake and, when necessary, nutritional counseling as well. The goal of these interventions was to improve the nutritional status of the patients. Increasing protein intake can increase lean body mass, regardless of when supplementation is initiated⁵². In addition, patients with spinal cord injury appear to benefit from adequate serum albumin levels^{53,54}. Having low albumin levels is also associated with an increased risk of having later cognitive impairment⁵⁵. Ensuring adequate protein intake is an essential intervention to ensure good health in the elderly⁵⁶. We found that vitamin D levels are inversely associated with cognitive difficulties, reported within the CCI. The role of vitamin D in cognitive impairment processes is still unclear. However, the finding we found is in line with some data in literature indicating that low vitamin D levels are associated with worse cognitive function⁵⁷⁻⁵⁹.

Comorbidity and Length of Stay

Comorbidity is a frequent feature in the elderly population. More than 50% of the elderly have at least three medical conditions. This is particularly important because the number of comorbidities is directly proportional to the number of days of hospitalization and is associated with a slower rehabilitation recovery. This finding is in line with some data in the literature indicating that multimorbidity has an important impact on rehabilitation outcomes⁶⁰⁻⁶². The patient with a greater number of comorbidities is a more complex patient to manage for various reasons. The heterogeneous pictures that are formed and the severity of the conditions produce different cumulative effects⁶³. For this reason, it is important to establish an individualized rehabilitation and discharge program for each patient⁶⁴ and the need to consider possible interactions and protective factors^{45,46,65}. The impact of comorbidities and CCI also affects the length of stay (LOS). This correlation is directly proportional and is in line with other data in the literature⁶⁶⁻⁶⁸.

Number of Infections and Indices of Inflammation

Infectious risk related to hospitalization is a well-known issue. There is typically a directly proportional relationship between the LOS in the hospital and the risk of having infections. Despite the precautions and protective devices used by healthcare personnel, there were several infections. The infections were mainly due to surgical wound infections, recurrences of previ-

ous infections, and new infections. Notably, the latter was also partly influenced by the healthcare environment we are facing at this time in history. The study was carried out during the SARS-CoV-2 pandemic, which affected the whole world. Certainly, this number of infectious events is not negligible and involves increasing healthcare costs. Subsequent efforts will have to be made to further reduce hospital infections and thus also the costs of the healthcare system. Surgical wound infections are an event that often causes lengthening LOS and healthcare costs^{69,70}. Recurrences of previous infections were often caused by infections previously acquired during hospitalization or prior. New infections were predominantly urinary tract, chronic obstructive pulmonary disease flare-ups, and pneumonia. In particular, urinary tract infections were linked at least in large part to the presence of the permanent bladder catheter. Although our goal has been early catheter removal, commonly, patients have reduced mobility in the first days of rehabilitation. This reduced autonomy causes them to require an indwelling urinary catheter. Catheter-associated urinary infections are frequent, especially in surgical patients⁷¹. The presence of this device, despite adherence to all expected hygiene standards to limit contamination, significantly increases the risk of urinary infections⁷². C-reactive protein (CRP) is a well-known marker of inflammation. In addition to being a marker for acute infection, CRP is also valuable in monitoring certain therapies. CRP is also correlated with some degree of low-grade inflammation (LGI), a frequent condition in the elderly⁷³. LGI is characterized by slightly increased levels of CRP and may reflect the existence of even sub-clinical disease⁷³. Also of interest is the positive correlation between CCI and CRP, which may, therefore, reflect some degree of LGI. We hope that this finding may be a cue for further studies in the future.

Limitations of the Study

The present work has limitations, including the lack of follow-up of patients after discharge. This consideration could be productive: after our preliminary analysis, an outpatient clinic was activated (in March 2022) to assess the clinical condition of patients after discharge (clinical follow-up). For this reason, we hope that the present study can be a stimulus for subsequent work that also includes and investigates the follow-up of patients in the territory.

Another limitation is the lack of a shared rehabilitation program between the hospital and the territory after discharge and the lack of data on subsequent hospital admissions. Our data are influenced by the presence of a Continuity of Care Unit, which is not present in all hospitals, and by the resources available in the territory.

Conclusions

This study stands as a report of our unit one-year experience in a complex socio-health situation during the SARS-CoV-2 pandemic. This last event changed the hospital management of patients and their reintegration into the community. If this is true for young or adult patients, it is even more complex for older adults. These are people who are fragile in more ways than one, alone or not self-sufficient, requiring a comprehensive intervention to reintegrate into the community. This process begins in the hospital, through the development of a dedicated and personalized rehabilitation and reintegration program that can help prevent disability, treat frailty, and promote the overall well-being of the patient.

This paper presents the preliminary findings of a retrospective observational study on inpatients admitted to the Rehabilitation and Physical Medicine Operative Unit during one-year. It is just a snapshot of the ward, but it could be suggestive of further studies to identify the variables contributing to possible prognostic index of discharge and length of stay. A similar data could be useful to improve Quality of Life of older adults and their relatives/caregivers and to reduce healthcare direct and indirect costs.

Conflict of Interests

The Authors declare that they have no conflict of interests.

Ethics Approval

The ethical approval was obtained by Fondazione Policlinico Universitario A. Gemelli – IRCCS. This study was conducted in accordance with the International Guidelines for Good Clinical Practice and the Declaration of Helsinki.

Informed Consent

All participants provided written informed consent before participation.

Availability of Data and Material

Data supporting the results are not available.

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Authors Contributions

All authors contributed, read and approved the final version of the manuscript.

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