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The Characteristics of Risk from Viewpoint of Prescription Drugs in Rehabilitation Patients

Nanba Yoshifumi[1, 2], Asonuma Yohei[2], Nagato Saki[2], Watanabe Juna[2], Asano Yuka[2], Takata Teruhiko[2]

[1]Department of Physical Therapy, Faculty of Rehabilitation, Kobe International University, Kobe, Japan

[2]Department of Rehabilitation, Seijinkai OOKUBO Hospital, Akashi, Japan

Email address:
nanba@kobe-kiu.ac.jp (N. Yoshifumi), ratededismylifer@gmail.com (A. Yohei), saki50ume69_0618@yahoo.co.jp (N. Saki),
rabbits1307@gmail.co.com (W. Juna), asyuka0827@gmail.com (A. Yuka), terutomo2194@yahoo.co.jp (T. Teruhiko)

Abstract: Purpose: Investigating using medicines in rehabilitation patient to understand risks predicted from the effects of those drugs to promote safe rehabilitation. Subjects & Methods: 1039 patients (age mean 75.6±16.91), 392 males (74.05±17.49) and 647 females (76.54±16.60), who receive PT, OT and ST at four medical institutions. The survey items included age, sex, prescribed medications, presence or absence of medication logbook and medical record. The drugs collected in the questionnaire were classified according to the general table of contents of pharmacotherapy specialized book in Japan. Results: 6477 prescription drugs (62 types) for 1039 patients. About 6.23 drugs were prescribed per patient. In order of appearance, Non-Steroidal Anti-Inflammatory drugs (NSAIDs) (742), Peptic ulcer treatment (740), Antihypertensive drugs (699), Laxatives (451), Antipsychotics, Antidepressants, Mood stabilizers and Psychostimulants (423), Infusions and nutritional products (365), Anti-anxiety drugs and Sleeping pills (282). Conclusion: One-third of the patients who participated in this study are at increased risk of falls due to the effects of the drug. Also, the risk of falls increases as the number of drugs increases. Taking more than 5 medications increases the risk of falls from 1.1 to 2.4. The study found that they were taking an average of 6.23 medications and were at high risk of falling. Importantly, PT, OT & ST are not pharmacological experts. We propose that therapists make efforts to understand how prescribed medications affect patients for rehabilitation safety.

Keywords: Medication, Rehabilitation, Risk Management

1. Introduction

Many great studies related to drug therapy and risk by previous researchers and our 2017 study, Rehabilitation Risk Management Strategies in Relation to Prescribed Medications, found that many patients on physiotherapy are on medication [1, 2]. Previous research have surveyed patients throughout the hospital, but there was no medication data for patients undergoing rehabilitation alone.

We will classify the drugs prescribed to physiotherapy and occupational therapy and speech therapy patients at hospital by questionnaire survey and study on the frequently prescribed drugs.

Based on the results, we will consider important medications for medical institution therapists and risk management to prevent medical accidents.

2. Subjects and Methods

The subjects for this research were 1039 patients (age mean 75.6±16.91), 392 males (74.05±17.49) and 647 females (76.54±16.60), who receive Physical therapy (PT), Occupational therapy (OT) and Speech therapy (ST) at four medical institutions, Seijinn-kai OOKUBO hospital, UNNAN city hospital, Kojin-kai KASHIMA hospital, Shouhei-kai DAISEN rehabilitation hospital by the outpatients and inpatients on July 2016, 2017 and April (～May) 2020.

The survey items included age, sex, prescribed medications, presence or absence of medical records and medication logbook. The drugs collected in the questionnaire were classified according to the general table of contents of

"Konnniti-no-tiryouyaku, Today's Therapeutic Drugs" (2016-2019, NANKOUDOU). Drugs classified into multiple item were classified as per the diagnostic name described in the questionnaire [3]. This study is approved by the ethics committee of Kobe International University (Ethics Committee Approval No G2016-045).

3. Results

The recovery rate was 44.2%. The proportion of males aged 65 and over was 57.1% (224), female was 63.7% (412), 61.2% in total. There were 6477 prescription drugs (61 types) for 1039 patients. About 6.23 drugs were prescribed per patient.

In order of appearance, Non-Steroidal Anti-Inflammatory drugs (NSAIDs) (742), Peptic ulcer treatment (740), Antihypertensive drugs (699), Laxatives (451), Antipsychotics, Antidepressants, Mood stabilizers and Psychostimulants (423), Infusions and nutritional products (365), Anti-anxiety drugs and Sleeping pills (282), Antithrombotic drug (255), Diabetes drug (237), Antibacterial drug (213), Therapeutic agents for Dyslipidemia and Hyperlipidemia (190), Bone and Calcium metabolism drugs (171), Diuretics (140), Antitussives and expectorants (111), Anti-allergic drugs (105), the above were the top quarter (15 types) of drugs. (Table 1).

Table 1. *Types and numbers of medications prescribed to rehabilitation patient.*

Non-Steroidal Anti-Inflammatory drugs (NSAIDs)	742
Peptic ulcer treatment	740
Antihypertensive drugs	699
Laxatives	452
Antipsychotics, Antidepressants, Mood stabilizers and Psychostimulants	423
Infusions and nutritional products	365
Anti-anxiety drugs and Sleeping pills	282
Antithrombotic drug	255
Diabetes drug	237
Antibacterial drug	213
Therapeutic agents for Dyslipidemia and Hyperlipidemia	190
Bone and Calcium metabolism drugs	171
Diuretics	140
Antitussives and expectorants	111
Anti-allergic drugs	105
Vitamin preparations	103
Steroids	101
Ophthalmic agent	100
Urinary and Genital agents	92
Vasodilators	91
Chinese herbal medicine	84
Stroke treatment	69
Anti-epileptic drugs	63
Gout and Hyperuricemia treatment	59
Parkinson's disease treatment	57
Bronchodilators and Bronchial asthma treatments and COPD treatments	53
Hematinic	49
Antianginal drug	41
Anti-arrhythmic drugs	36
Autonomic nerve agents Anti-malignant tumor drug	28
Muscle relaxant Dermatological agent	27
Antiemetic and Antispasmodic Anti-dementia drugs	23
Anesthetic	22
Hemostatic drugs Thyroid disease treatment Kidney disease therapeutic agent	15
Biliary tract disease treatment Narcotics and similar drugs Liver disease treatment	13
Hemorrhoidal disease treatment Enteropathy drug	12
Anti-rheumatic drugs	10
Other hormones	7
Heart failure drugs and pressor drugs Antifungal drug	6
Female hormone Disinfectant	5
Dental and Oral preparations Spleen disease treatment Immunosuppressive drugs	4
Prokinetic agent (Gastrointestinal motility promoter) Anti-viral drugs and Anti-viral therapy drugs Migraine Chronic Pain Treatment Anti-parasitic drugs	3
Male Hornmon	2
Blood products Otorhinolaryngological agent Addiction treatment	1

4. Discussion

The most prescription NSAIDs are typical pain-relieving drugs, suggesting that many rehabilitated patients suffer from pain. Many patients undergoing rehabilitation need to choose a pain-relieving treatment that does not rely solely on medication.

After arranging prescriptions in descending order, the most frequent prescriptions were drugs for improving gastrointestinal function (H2 inhibitors, PPIs) and Peptic ulcer treatments (520), these patients were often also taking analgesics. It is reported that 3 to 15% of NSAID recipients experience gastrointestinal disorders due to the side effects of COX-I inhibition, and typically receive prescriptions for prevention of these conditions [4-7].

However, in this questionnaire, it was not possible to classify whether it was prescribed because of an actual gastrointestinal disorder or whether it was used to prevent side effects with respect to the use as NSAIDs. Therapists should take into consideration declines in physical strength due to anorexia and abdominal pain for these patients [8, 9].

Patients using the non-steroidal anti-inflammatory drugs (512) often have reduced physical abilities due to pain or fever. The non-steroidal anti-inflammatory drugs shown here were counted as analgesics that did not use steroids. Therefore, it contains acetaminophen (AAP), opioids, and neuropathic pain relievers. Those risks include drowsiness, somnolence, and nausea [10, 11].

The third most common drug was anti-hypertensive drugs (461). There are four kinds of high blood pressure first-line drugs for patients without complications, Calcium antagonist, Angiotensin II Receptor Blocker (ARB), Angiotensin-converting-enzyme (ACE) inhibitor, and diuretics [12].

The antihypertensive agents were used alone, in combination with these four other drugs, or in combination with each other. As the number and number of ingredients used increases, it indicates that it is severe and intractable. In such cases, therapists should not only measure blood pressure before and after treatment, but also check it during physical exercise. In addition, it is necessary to make a plan for improving blood pressure by physical exercise so as not to be overly dependent on drug therapy.

Laxative drugs (278) can cause dehydration and electrolyte imbalance due to loose stools and diarrhea, and patients frequently complain of tachycardia, fatigue or thirst [13, 14].

Therapists are recommended to examine blood test data specifically blood urea nitrogen (BUN), Creatinine (Cr), BUN / Cr ratio of patients to determine hydration status and healthy blood flow in addition to physical evaluation such as amount of hydration and skin tone (Turgor test). It should be noted that BUN changes depending on muscle mass and amount of meat eaten [15].

On the other hand, estimated glemerular filtration rate (e-GFR) (mL / min / 1.73 m^2) is calculated as a standard physique, height 170 cm and weight 63 kg [16]. Therefore, renal function in patients with small, bedridden infirm or sarcopenia should be considered to be overestimated in e-GFR. Therapists must have sufficient knowledge to be able to evaluate the effects of the medications on the patient physical condition and on blood test values.

The average age of the subjects was 75.6 years old, 63.7% were female. Older people are at higher risk of falling due to decreased muscle strength, cognition, balance response, visual acuity, and balance response. The average age of this patient is also high, and even if the effects of the drug are excluded, the risk will be higher than originally.

According to previous studies, the incidence of falls is high for both men and women over the age of 75. It can be predicted that the risk of falls will increase further if more polypharmacy is used in the elderly aged 75 and over. Therapists should add age and polypharmacy considerations to their pre-exercise and rehabilitation assessments [17].

The results resulted in antihypertensives, anxiolytics, hypnotics, diabetes, antipsychotics, antiallergic drugs, antiepileptic drugs, muscle relaxants, Parkinson's disease drugs, and prostate drugs, which are especially at high risk of falling [18-21].

It was 30% of the drug (1926 drug). Therefore, one-third of the patients who participated in this study are at increased risk of falls due to the effects of the drug. Also, the risk of falls increases as the number of drugs increases. Taking more than 5 medications increases the risk of falls from 1.1 to 2.4. The study found that they were taking an average of 6.23 medications and were at high risk of falling [22].

For these patients in particular, Therapists should be well aware of the risks of falling during rehabilitation, standing and sitting, stepping, gait, activity of daily living, general movement and so on. According to the Fall prediction model of KAMEDA medical center, the odds of falling are the highest in patients with a history of falls (3.5x), followed by patients taking tranquilizers (1.8x). 6.5% of patients in our group were taking tranquillizers [23]. From this information, we may expect a high number patients with an elevated fall risk.

5.6% of patients were prescribed anti-coagulant and anti-platelet treatment drugs, so therapists should be aware of delayed hemostasis and increased risk of bleeding injuries due to falls, bruising, strenuous and high load exercises.

5. Conclusion

Importantly, PT, OT & ST are not pharmacological experts. Based on our study, we recommend therapists consult with prescribing doctors or pharmacists, and other co-medical staff frequently. In addition, we propose that therapists make efforts to understand how prescribed medications affect patients for optimal rehabilitation safety.

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