CLINICAL SCIENCE OF NUTRITION

Case Report

Clin Sci Nutr 2019; 1(1): 57-60 • DOI: 10.5152/ClinSciNutr.2019.08

The medication management in a patient with resistant hypertension with percutaneous endoscopic gastrostomy tube: The role of the clinical pharmacist

Burcu Kelleci[1], Nisa Ballı[1], Müge Savaş[1], Cafer Balcı[2], Mert Eşme[2], Kutay Demirkan[1], Meltem Gülhan Halil[2]

ABSTRACT

Resistant hypertension (RH) is characterized as a clinical condition in which the patient needs three antihypertensive medications including diuretic for uncontrolled blood pressure (BP). Treatment of RH involves improving medication adherence and correct administration. Medication administration may be the key point when the patients' clinical conditions are not applicable for oral drug administration. Thus, comprehensive investigation of the patient is extremely important to identify the right medication, administration route, and time. In this case report, BP control was not achieved despite consulting several related medical services/departments for the patient with gastrostomy and uncontrolled RH. Thereafter, BP was gradually decreased with the intervention of the clinical pharmacists based on detailed research about the appropriateness of drug administration through percutaneous endoscopic gastrostomy (PEG) tube and timing. Drug administration via a PEG tube or feeding tube can be challenging at some points. Although drug–drug interactions can be recognized easily, potential drug–nutrient interactions should be also considered.

Keywords: Clinical nutrition, clinical pharmacy, drug administration, percutaneous endoscopic gastrostomy, resistant hypertension

ORCID ID of the author:
B.K. 0000-0003-2547-8919;
N.B. 0000-0002-8611-3991;
M.S. 0000-0001-9319-477X;
C.B. 0000-0002-1478-1106;
M.E. 0000-0003-3617-2077;
K.D. 0000-0002-6427-5826;
M.H. 0000-0001-7597-8140

[1]Department of Clinical Pharmacy, Hacettepe University Faculty of Pharmacy, Ankara, Turkey
[2]Department of Internal Disease Division of Geriatric Medicine, Hacettepe University School of Medicine, Ankara, Turkey

Submitted:
26.11.2018

Accepted:
04.01.2019

Corresponding Author:
Burcu Kelleci

E-mail:
burcukey@yahoo.com

Introduction

Resistant hypertension (RH) is defined as a clinical condition in which the patient is prescribed ≥3 antihypertensive medications including diuretic for uncontrolled blood pressure (BP) or the patient requires ≥4 antihypertensive medications to achieve target BP levels (1).

The prevalence of RH is unclear, but the reported prevalence is approximately 13% in the adult population and appears to be a relatively common problem in many countries (1, 2). However, the prevalence would be almost 4% higher with the implementation of the new BP target levels of <130/80 mm Hg (3, 4).

The prognosis of RH has not been sufficiently determined compared with that of those who more eagerly achieve control; however, the risk of myocardial infarction, stroke, end-stage renal disease, and congestive heart disease may be two to sixfold higher in adults with RH than in those with controlled hypertension (HT) (5, 6).

Medication administration may be the key point when the patients' clinical conditions are not applicable for oral drug administration. Thus, comprehensive investigation of the patient is extremely important to identify the right medication, administration route, and time. Patients' medication adherence is also important as well as correct administration method and timing. Here, we report a patient with gastrostomy and uncontrolled RH whose BP control was not achieved despite consulting several related medical services/departments but not clinical pharmacy department.

Cite this article as: Kelleci B, Ballı N, Savaş M, Balcı C, Eşme M, Demirkan K, et al. The medication management in a patient with resistant hypertension with percutaneous endoscopic gastrostomy tube: The role of the clinical pharmacist. Clin Sci Nutr 2019; Clin Sci Nutr 2019; 1(1): 57-60.

Table 1. Medication-related recommendations and changings		
Medication	Information provided by the clinical pharmacist	Physicians' intervention
Carvedilol	Tablet can be crushed. Absorption will be delayed with nutrients. All beta-blockers will reduce the bioavailability of lercanidipine with a 50% reduction in hepatic blood flow	Switched to nebivolol treatment because absorption is unaffected by food. About the interaction with lercanidipine, no action is taken
Valsartan	Tablet can be crushed. Bioavailability reduces 40% with nutrients	Administration time changed from 08:00 a.m. to 06:00 a.m. before feeding starts
Furosemide	Bioavailability reduces 30% with nutrients	Administration time changed from 08:00 a.m. to 02:00 p.m
Lercanidipine	Tablet can be crushed. The drug–nutrient interaction was reported. Oral availability of lercanidipine increased fourfold when ingested 2 h after a high-fat meal	Dose and administration time changed from 05:00 p.m. to 10:00 a.m. and 09:00 p.m
Acetylsalicylic acid	With pharmacodynamics antagonism, the activity of furosemide, carvedilol, and valsartan will be reduced (recommendation: monitor closely)	No action is taken

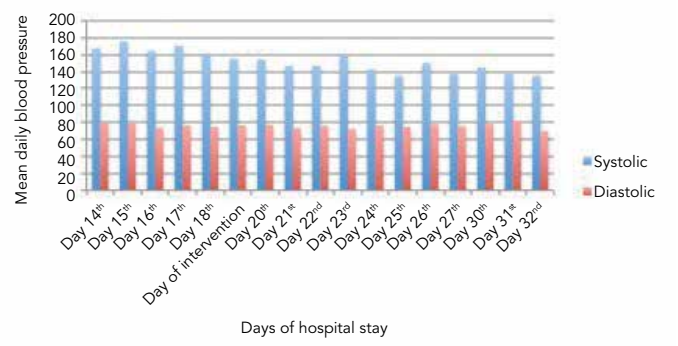

Figure 1. Daily blood pressure before and after intervention

Case Presentation

We present a case of a 62-year-old Caucasian woman who has an oxygen concentrator and gastrostomy with a medical history of essential HT (25 years), diabetes mellitus (DM) (25 years), dyslipidemia (3 years), chronic obstructive pulmonary disease (7 years), and chronic kidney disease (10 years). The patient's relatives provided verbal consent for this case report. Approximately 1 year ago, percutaneous endoscopic gastrostomy (PEG) tube was placed for feeding as well as for oral drug administration. Continuous enteral feeding was provided through a PEG tube with 230 mL Glucerna SR (Abbott, IL, USA). The only information about her family history was a brother with DM. She has a history of 10 pack-years of cigarette smoking, but no alcohol.

She was taking amlodipine (Norvasc; Pfizer, NY, USA) (10 mg daily), nebivolol (Vasoxen; Ulagay Ilac, Istanbul, Turkey) (5 mg daily), diltiazem (Diltiazem; Mustafa Nevzat Ilac, Istanbul, Turkey) (90 mg daily), and doxazosin mesylate (Cardura; Pfizer, NY, USA) (16 mg daily) for HT. Her BP was approximately 140/80 mmHg while she was adherent to her medication treatment; if not, it would increase up to 180/90–190/95 mmHg. In her medication history, she used different antihypertensive combinations with different doses at different periods of her life.

She was admitted to the intensive care unit (ICU) with chest pain, shortness of breath, and headache. On admission at the ICU, her physical examination was as follows: body temperature 36.4°C, pulse rate 70 beats/min, BP 140/80 mm Hg, and body mass index 33.2 kg/m^2. Her laboratory test results were also as follows: serum creatinine 1.21 mg/dL, sodium 139 mEq/dL, potassium 4 mEq/dL, blood urea nitrogen (BUN) 42 mg/dL, hemoglobin 9 g/dL, B-type natriuretic peptide (BNP) 154 pg/mL, and pCO_2 53 mmHg.

While the patient was stable, she was transferred to the internal medicine service on day 4. Owing to uncon-

trolled BP, several departments, such as nephrology, geriatric medicine, and cardiology departments, were consulted for managing her RH treatment. However, all interventions of these consultations failed (Figure 1), unless the administration of antihypertensive medications intravenously.

Thereafter, BP was gradually decreased with the intervention of the clinical pharmacists and geriatricians based on detailed research about the appropriateness of drug administration through PEG tube and timing and drug–nutrient and drug–drug interactions (Table 1). Some of the recommendations of the clinical pharmacists have not been accepted by the physicians. Then, her BP was controlled with spironolactone (Aldactone; Ali Raif Ilac, Istanbul, Turkey) (100 mg daily), alpha methyldopa (Alfamed; Ulagay Ilac, Istanbul, Turkey) (250 mg three times daily), valsartan (Diovan; Novartis, Basel, Switzerland) (320 mg daily), furosemide (Lasix; Sanofi Aventis, Paris, France) (40 mg daily), nebivolol (Nexivol; Abdi Ibrahim Ilac, Istanbul, Turkey) (10 mg daily), and lercanidipine (Lercadip; Actavis, NJ, USA) (20 mg twice daily).

The patient was discharged on day 39, with BUN 63 mg/dL, serum creatinine 1.46 mg/dL, sodium 137 mEq/dL, potassium 4.5 mEq/dL, hemoglobin 10.1 g/dL, BNP 42 pg/mL, and BP 140/80 mm Hg. Her nutritional therapy plan was rearranged according to the current medication administration through PEG tube. Intermittent enteral feeding was provided after intervention day at 12:00 p.m., 6:00 p.m., 12 a.m., and 6 a.m. with Glucerna Select (Abbott) (450 mL four times daily).

Discussion

Frequent usage of feeding tubes and ostomy is increasing in both hospital settings and other care facilities. Feeding tubes are used not only for nutrients but also for medication administration (7).

Medication administration may be challenging with regard to pharmaceutical, legal, and technical issues. From the pharmaceutical aspect, some variables should be taken into account, such as interactions, stability, and effectiveness. From the legal aspect, it should be noted that medication administration via a feeding tube is an off-label procedure. Therefore, all aspects of appropriate medication administration through a feeding tube should be considered for better patient outcomes and safety.

Conclusion

There are many components to consider for RH, such as BP measuring technique, white coat HT, secondary causes of HT, and medication compliance. This case report indicated that the medication administration method also needs to be evaluated especially for patients with PEG tubes. An appropriate treatment should include the right antihypertensive drugs and their right administration information.

Uncontrolled HT may cause many complications including cardiovascular diseases, stroke, and organ damages. Therefore, it is important to achieve BP control. Although previous studies mentioned many other factors involved in HT, to the best of our knowledge, no study was found that indicates clinical nutrition and RH relationship. More clinical research and special consideration may be needed to obtain optimal treatment strategies for this particular group of patients.

Informed Consent: Verbal informed consent was obtained from the patient's relatives who participated in this case.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – B.K., M.E., M.H.; Design – N.B., B.K., C.B., M.S., K.D., M.H.; Supervision – B.K., C.B., M.E., K.D., M.H.; Resources – C.B., M.E., K.D., M.H.; Materials – C.B., M.E., B.K., M.H.; Data Collection and/or Processing – B.K., N.B., M.S., C.B., M.E.; Analysis and/or Interpretation – B.K., N.B., M.S., K.D.; Literature Search – N.B., M.S., M.E.; Writing Manuscript – B.K., N.B., M.S., C.B., M.E., K.D., M.H.; Critical Review – B.K., C.B., M.E., K.D., M.H.

Conflict of Interest: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

References

1. Whelton PK, Carey RM, Aronow WS, Casey DE, Jr., Collins KJ, Dennison Himmelfarb C, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. J Am Coll Cardiol 2018; 71: e127-248.
2. Calhoun DA, Jones D, Textor S, Goff DC, Murphy TP, Toto RD, et al. Resistant hypertension: diagnosis, evaluation, and treatment: a scientific statement from the American

Heart Association Professional Education Committee of the Council for High Blood Pressure Research. Circulation 2008; 117: e510-26.
3. Persell SD. Prevalence of resistant hypertension in the United States, 2003-2008. Hypertension 2011; 57: 1076-80. [Crossref]
4. Achelrod D, Wenzel U, Frey S. Systematic review and meta-analysis of the prevalence of resistant hypertension in treated hypertensive populations. Am J Hypertens 2015; 28: 355-61. [Crossref]
5. Smith SM, Huo T, Delia Johnson B, Bittner V, Kelsey SF, Vido Thompson D, et al. Cardiovascular and mortality risk of apparent resistant hypertension in women with suspected myocardial ischemia: a report from the NHLBI-sponsored WISE Study. J Am Heart Assoc 2014; 3: e000660.
6. Bangalore S, Fayyad R, Laskey R, Demicco DA, Deedwania P, Kostis JB, et al. Prevalence, predictors, and outcomes in treatment-resistant hypertension in patients with coronary disease. Am J Med 2014; 127: 71-81. [Crossref]
7. Matysiak-Lusnia K, Lysenko L. Drug administration via enteral feeding tubes in intensive therapy - terra incognita? Anaesthesiol Intensive Ther 2014; 46: 307-11.