ISSN (P) : 2589-9120 / (O) : 2589-9139
PubMed-National Library of Medicine - ID: 101773527

International Journal of Medical Science and Applied Research (IJMSAR)

Available Online at: https://www.ijmsar.com

Volume – 5, Issue – 3, May – 2022, Page No. : 31 – 38

Effect of Dietary Consumption of Mung Beans (Vigna Radiata) in Patients Receiving Long Term Warfarin Therapy

[1]Dr. Sherin Alexander, Clinical Pharmacist, Believers Church Medical College Hospital, Thiruvalla, Kerala, India

[2]Dr. Joise P, Clinical Pharmacist, Believers Church Medical College Hospital, Thiruvalla, Kerala, India

[3]Dr. Sneha Merin Shaji, Clinical Pharmacist, Believers Church Medical College Hospital, Thiruvalla, Kerala, India

[4]Dr. Grace Mary John, Clinical Pharmacist, Believers Church Medical College Hospital, Thiruvalla, Kerala, India

[5]Anjali R, Pharm D Intern, Clinical Pharmacist, Believers Church Medical College Hospital, Thiruvalla, Kerala

[6]Prof. Dr. George Chandy Matteethra, Professor and HOD, Department of Gastroenterology, Believers Church Medical College Hospital, Thiruvalla, Kerala, India

Citation of this Article: Dr. Sherin Alexander, Dr. Joise P, Dr. Sneha Merin Shaji, Dr. Grace Mary John, Anjali R, Prof. Dr. George Chandy Matteethra, "Effect of Dietary Consumption of Mung Beans (Vigna Radiata) in Patients Receiving Long Term Warfarin Therapy,'' IJMSAR – May – 2022, Vol. – 5, Issue - 3, Page No. 31-38.

Corresponding Author: Dr. Sherin Alexander, Clinical Pharmacist, Believers Church Medical College Hospital, Thiruvalla, Kerala

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background

Diet composition is one of the factors that may contribute to individual variability in the anticoagulant response to warfarin. Mung bean consumption is very common among the South Indian community. We observed that patients who are taking mung beans are prone to have more fluctuation in their INR values. Since no prior studies have been explored on this, we sought to do the study.

Results

A total of 110 patients who were on warfarin therapy were identified. The overall age range was 50-75 years; mean age 62 ± 2 years. The anticoagulation effect was assessed with the use of International Normalised Ratio value (INR). Most fluctuating INR levels were observed with those patients who were on a moong diet (n=38) with an average INR drop to 1.49 ± 0.41. Moreover, on assessing the association between trends of different types of vegetarian diets and the proportion of INR drop among the study groups, more

than three fourth (n=40) of patients who were analysed with INR fluctuations (n=61) were flexitarians.

Conclusion

Most of the patients were seen to have a mung bean rich diet. Consumption of mung beans in varied patterns can also cause fluctuations in their INR value. Hence, this study necessitates a detailed history taking to identify the right cause of the variation in INR values in terms of diet among the patients on anticoagulation therapy especially for those who are on warfarin.

Keywords

Mung bean, International normalized ratio, Warfarin, Vitamin K.

Introduction

Anticoagulation is the backbone therapy for the prevention and management of thromboembolic complications in patients with atrial fibrillation (AF), prosthetic heart valves, pulmonary embolism (PE) and deep vein thrombosis (DVT). For long-term management, oral anticoagulation is preferred over the intravenous or subcutaneous routes for better patient compliance and convenience.[1]

Warfarin has been in clinical use for over six decades and is still one of the most widely used oral anticoagulants. Despite its widespread use, warfarin is not without limitations. Due to a narrow therapeutic index, a somewhat unpredictable pharmacokinetic profile, and the potential to interact with a number of drugs, foods, dietary supplements, and certain lifestyles, routine laboratory monitoring is required for safe and effective use. Most patients exhibit unreliable dose response and thus require frequent monitoring of the INR levels. There are many factors that influence the variation of INR values such as medications, diet and herbal products. Medications like rifampicin, antifungals, anti-inflammatory drugs, antiplatelets have shown to alter the efficacy of warfarin, either by increasing or decreasing the INR value. Diet composition is also one among other factors that may contribute to individual variability in the anticoagulant response to warfarin. Indians with their diverse dietary regime, as compared to the western population are more vulnerable for warfarin - food interactions. For example, inconsistency in the intake of green leafy vegetables like spinach, drumstick leaves, cauliflower, cabbage and other foods rich in vitamin K, are proved to contraindicate the target INR on patients with warfarin.

Mung bean (mung bean) or Vigna radiata L is an excellent source of vitamins such as (VitaminA, Vitamin B, Vitamin C and Vitamin K), high quality protein and significant amount of certain bio-active compounds such as polyphenols, polysaccharides and peptides.

However, there are no studies that have been done to confirm the impact of mung beans on the INR value. Hence, our study aimed to find out the association between the variation of PT/INR levels and mung bean consumption among the patients on warfarin.

Method

It was a case control study extended over a period of 6 months. Patients' data were collected on the basis of inclusion and exclusion criteria. The study got clearance from the institutional ethical committee, Believers Church Medical College Hospital, Kerala, India. A written informed consent was obtained from all the study participants after full explanation of the purpose and nature of all procedures used. We included all the adult patients visiting our hospital, who were on warfarin. Patients on vitamin K rich products other than

mung beans, lactating women, age <18 years and >80 years were excluded from the study.

All the relevant data for the study were collected from patient medical records (patient demographics, name and specialty of consultant, diagnosis, INR values and concomitant drugs). The enrolled patients were interviewed regarding their method of taking warfarin, day to day dietary habits and the time gap between the medication and food. The INR values, the dose of warfarin were noted at the time of enrollment and were monitored in the followup and the details were entered into a proforma.

Result

Warfarin therapy and gender distribution

Altogether 110 patients who were on warfarin therapy were identified. Among which 65 were males while female gender constituted only 49.09% (n=45). The overall age range was 50-75 years; mean age 62 ± 2 years.

Mung bean consumption and gender

About 56 of 110 (50.9%) were reported to consume mung beans while 54 (49.09%) were non consumers. More than half of the mung consumers were men (n=38 (67.85%)) whereas

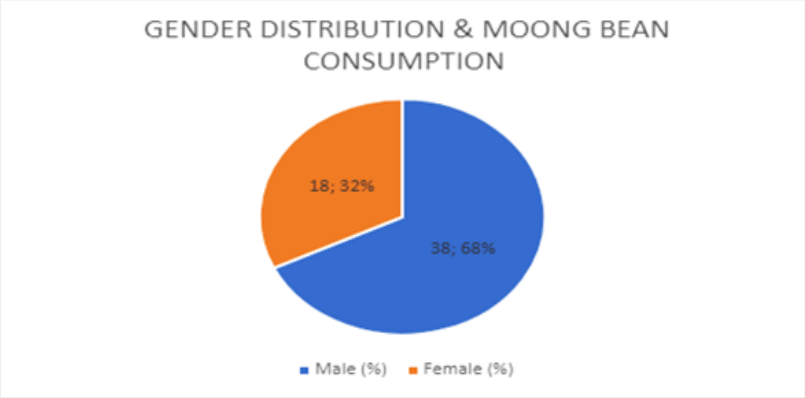

Figure No. 1: Gender distribution and mung consumption

The number of women who consumed mung was just 18 (32.14%). The numbers are explained and tabulated below

PARAMETER	GENDER DISTRIBUTION		Total
	Male (%)	Female (%)	
Patients on mung	18 (67.85)	38 (32.14)	56
Patients not on mung	27 (50)	27 (50)	54
Total	65 (59.09)	54 (49.09)	110

Table No. 1: Gender distribution and mung consumption

Assessment of Anticoagulation Effects

The anticoagulation effect was assessed with the use of International Normalised Ratio value (INR). The therapeutic INR range was 2.0 to 3.0 for most patients and 2.5 to 3.5 for patients with artificial valve replacement. We observed an INR drop to 1.49 ± 0.41 in 38 patients out of 56 mung consumers.

PARAMETER	INR LEVELS		Total
	Normal INR (%)	INR decreased (%)	
Patients on mung	18 (32.2)	38 (67.8)	56
Patients not on mung	31 (57.4)	23 (42.6)	54
Total	49 (44.5)	61 (55.5)	110

OR 2.85 (1.31 - 6.2) - 2.85 higher risk of INR value drop

Table No. 2: Correlation between mung bean consumption and INR fluctuation

The above table discusses the correlation between mung bean consumption and the INR value deviation. Out of 110 patients, 38 people among the total mung consumers (N=56) showed deviation in their INR level to below the required therapeutic range.

Correlation between Gender and Fluctuating INR Levels

While studying the correlation between INR level drop, gender and mung consumption, it was observed that the most fluctuating INR levels were observed with those patients who were on a mung diet (n=38). A significant disparity was observed when analysing the gender, mung consumption and INR level changes. Out of the 38 mung consumers with INR level variation, 24 (63.2%) were male while only 14 (36.8%) constituted the female gender.

PARAMETER	GENDER DISTRIBUTION BASED ON FLUCTUATING INR		Total patients with fluctuating INR
	Male (%)	Female (%)	
Patients on mung	24 (63.2)	14 (36.8)	38
Patients not on mung	12 (52.2)	11 (47.8)	23
Total	36 (59)	25 (41)	61

Table No. 3: The above table shows the association between INR fluctuations, and mung consumption among the genders

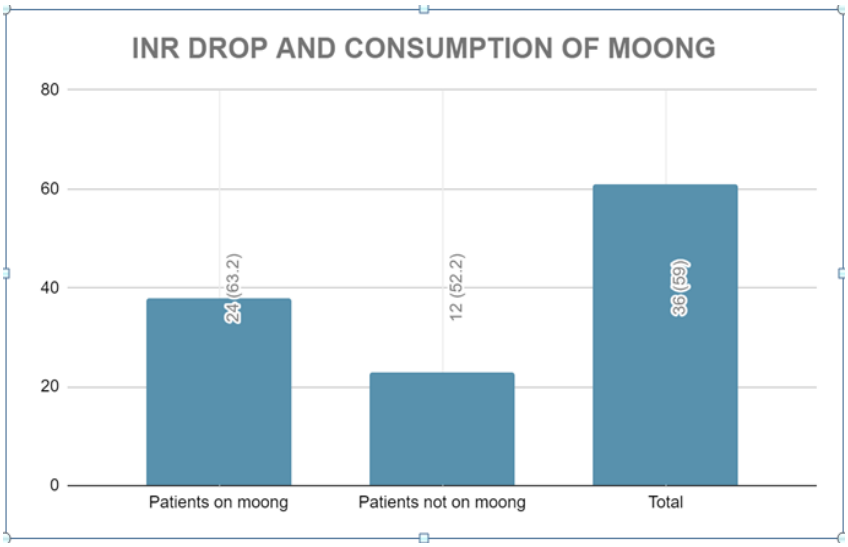

Figure No. 2: INR level variations were observed in a total of 51 patients of which 38 patients were on mung diet

Diet Trends and INR Fluctuations

In our present study we reliably assessed the association between trends of different types of vegetarian diets and the proportion of INR drop among the study groups. We studied the INR fluctuations among people with different diet patterns who were on warfarin therapy.

The results showed more than half of the total study population, a total of 61 patients had an INR drop and more than three fourth (n=40) of those 61 people were flexitarians (people who are vegetarian and occasionally ate fish, meat) which is a significant result.

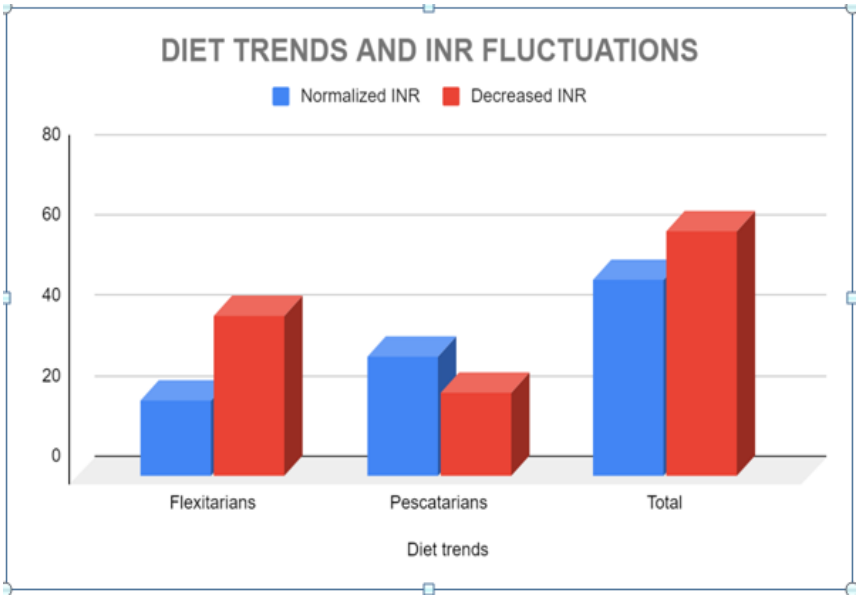

Figure No. 3: Diet trends and INR fluctuation

PARAMETER	INR FLUCTUATIONS		TOTAL
	Normalized INR	Decreased INR	
Flexitarians	19	40	59
Pescatarians	30	21	51
Total	49	61	110

Table No. 4: The decrease in INR level was comparatively less observed among those who did not consume fish or meat at all (Pescatarians).

Discussion

Warfarin is an oral anticoagulant, which is used to prevent and manage thromboembolism. The target range of the INR (specific tool used in patients who are on conventional anticoagulants) is different in each medical condition. It is a drug with a narrow therapeutic index and hence dosing is variable among patients. There exist various factors which have an association with the variation in anticoagulation. Those factors include age, gender, vitamin K intake, albumin level, ethnicity, indication for anticoagulation, and interacting diet/drug can all contribute to the variation. [1,2,3]

Usually the initiation of therapy at a dose of 4 – 5 mg is recommended, but smaller doses are indicated for elderly and infirm patients.[4] Clinically remarkable drug interactions can occur when an interacting food, drug or herbal supplement is added during warfarin therapy. Green leafy vegetables and oils are the primary sources of vitamin K rich supplements that are proven to be contraindications to warfarin therapy. Patients with unstable control of INR may have poor and variable intake of vitamin K. [2]

Pedersen FM, Hamberg O, Hess K, et al., discussed the scope and the potential clinical impact of the commonly reported dietary supplements, food and herbal interactions with warfarin therapy. Also highlighted the practical steps to be taken by the patients and healthcare providers to minimize all those interactions. He signalized that among many factors that interfere with warfarin, its interactions with dietary vitamin K and other herbal supplements were most frequently elicited leading to variation in anticoagulant control. [5]

Faria, Simone Aparecida dos Santos Conceição, et al., in their study assessed the proportion of vitamin K content in the food the people in Sao Paulo, Brazil consumed. Leafy vegetables occupied an important place in their daily diet. Twenty different leafy vegetables were collected and analysed using the HPLC method. Results showed that higher levels of phylloquinone were found in raw leafy vegetables among which darker green leaves such as spinach, broccoli, parsley, kale, watercress and chicory catalogna had more quantity of the derivative.[6]

In our study, we incorporated 110 people from the Southern part of India where the majority took mung beans in their daily dietary habits. Mung bean (Vigna radiata) is an important edible legume grown globally, especially in Asian countries (mainly in India,

China, Pakistan, Bangladesh, and some Southeast Asian countries) as well as in dry regions of southern Europe and warmer parts of the United States and Canada.[7] In the predominantly cereal-based diets of China and India, the mung bean has been consumed as a staple food for centuries. It is an excellent source of proteins, vitamins, minerals, dietary fiber and also has significant amounts of bioactive compounds like peptides, polyphenols and polysaccharides.[8,9] Moreover, mung bean protein is easily digestible[10,11] and a half cup of mung bean consists 16 – 17mcg of vitamin k.[12]

Conclusion

This study helped us to identify a correlation between mung bean consumption and alteration of INR values in patients who are on warfarin. Inconsistent amounts of mung bean in the diet can cause variation in these values. Hence, this study necessitates a detailed history taking to identify the right cause of the variation in INR values in terms of diet among the patients on anticoagulation therapy especially for those who are on warfarin.

By taking detailed patient interviews, one could easily identify the cause for the variation in the INR levels and thus help the health care provider to choose a better therapeutic regimen for the patient. Moreover, to ensure an accurate warfarin regime, it is important to keep track of the quantity of vitamin K rich foods taken on a weekly basis. This could help us to adjust warfarin doses accordingly on the basis of Vitamin K intake.

List of Abbreviations

INR: International Normalized Ratio

DVT: Deep Vein Thrombosis

PE: Pulmonary Embolism

AF: Atrial Fibrillation

References

1. Gieling E, de Vries F, Williams R, van Onzenoort HA, De Boer A, Ten Cate V, Kramers C, Burden A. Mortality risk in atrial fibrillation: the role of aspirin, vitamin K and non-vitamin K antagonists. Int. J. Clin. Pharm.. 2019 Dec 1;41(6):1536-44.
2. Violi F, Lip GY, Pignatelli P, Pastori D. Interaction between dietary vitamin K intake and anticoagulation by vitamin K antagonists: is it really true?: a systematic review. Medicine. 2016 Mar;95(10).
3. Nutescu EA, Shapiro NL, Ibrahim S, West P. Warfarin and its interactions with foods, herbs and other dietary supplements. Expert opinion on drug safety. 2006 May 1;5(3):433-51.
4. Gopalakrishnan S, Narayanan S. Oral anticoagulants: current Indian scenario. Medicine update. The Association of Physicians of India. 2013:410-3.
5. Pedersen FM, Hamberg O, Hess K, et al. The effect of dietary vitamin K on warfarin-induced anticoagulation. J Intern Med. 1991; 229(6):517-20
6. Turck D, Bresson JL, Burlingame B, Dean T, Fairweather-Tait S, Heinonen M, Hirsch-Ernst KI, Mangelsdorf I, McArdle HJ, Naska A, Nowicka G. Dietary reference values for vitamin K. EFSA Journal. 2017 May 1;15(5).
7. Faria SA, Arruda VA, Araújo ED, Penteado MD. Vitamin K: content in food consumed in São Paulo, Brazil. Brazilian Journal of Pharmaceutical Sciences. 2017;53(2).
8. Ganesan K, Xu B. A critical review on phytochemical profile and health promoting effects of mung bean (Vigna radiata). Food Science and Human Wellness. 2018 Mar 1;7(1):11-33.

9. Dahiya PK, Linnemann AR, Van Boekel MA, Khetarpaul N, Grewal RB, Nout MJ. Mung bean: Technological and nutritional potential. Critical reviews in food science and nutrition. 2015 Apr 16;55(5):670-88.
10. Hou D, Yousaf L, Xue Y, Hu J, Wu J, Hu X, Feng N, Shen Q. Mung bean (Vigna radiata L.): Bioactive polyphenols, polysaccharides, peptides, and health benefits. Nutrients.2019 Jun;11(6):1238.
11. Mubarak AE. Nutritional composition and antinutritional factors of mung bean seeds (Phaseolus aureus) as affected by some home traditional processes. Food chemistry. 2005 Mar 1;89(4):489-95.
12. Yi-Shen Z, Shuai S, FitzGerald R. Mung bean proteins and peptides:nutritional, functional and bioactive properties. Food & nutrition research. 2018;62.

.