

Original article:

Correlation between ABO/Rh Blood Groups with the incidence of renal calculi

Dr. A. Rafiq Anwar M.S., M.Ch (Urology)¹, Dr. A. Ahamed Basha B.S.M.S., M.Sc., Ph.D²

Department of Urology¹, Department of Physiology²,
Chettinad Hospital and Research Institute, Rajiv Gandhi Salai, Kelambakkam,
Chennai – 603103, India.
Corresponding author : Dr. A. Ahamed Basha

Abstract:

Background: Occurrence of renal calculi is reported to be increasing in several countries. Factors like age, sex, BMI and life style modifications are linked to it. However, the role of blood group system in the incidence of renal calculi is under research.

Objective: To evaluate the association between ABO and Rh factor blood group system with the incidence of renal calculi.

Methodology: A case control study was done from 150 medical case records of known renal calculi subjects at Chettinad Hospital and Research Institute, Chennai, India. From the case records, A, B, O and AB blood groups, Rh factor distribution in renal calculi subjects were collected and percentage distribution of above mentioned blood groups were analyzed.

Results: Incidence of renal calculi was O > B > A > AB among the study groups. Rh - ve individual showed a significant lower incidence when compared to Rh + ve subjects. In that, A and AB – ve were observed to be the least affected with nil incidences among the study population.

Conclusions: This study gives an idea that O, B and Rh + ve individuals are more susceptible for renal calculi. Future studies to be done at molecular level to understand the link between blood group system and incidence of renal calculi.

Key Words: ABO blood group, Rh factor, renal calculi

Introduction

The prevalence of renal calculi has increased to a greater extent in the recent decades across several countries(1). Severe dehydration(2), excessive dietary intake of animal protein(3) and life style modifications(4) are the commonest risk factors for the occurrence of renal calculi. Association of other risk factors like age, sex, obesity, metabolic disorders and habitants residing in industrial areas with the frequency of renal calculi are under research. Even though, it is not life threatening disease, if proper treatment is not taken, it can end up with several complications like sepsis, steinstrasse and renal failure. Additionally, incidence of renal calculi formation is strongly associated with diabetes(5), metabolic syndrome(6) and urinary uromodulin(7).

Considering the risk factors for various pathological conditions, researchers have made an effort to find the association between the incidences of ABO blood group system with several diseases. A positive correlation has been linked between gastric and hepatic cancer with A and non O blood group individual respectively (8, 9). Another study proved that, correlation between acid peptic diseases with O blood group persons(10). A strong association was also observed between dermatological disorders and A, AB and O blood group population(11). In the field of cardiology, it is documented that non O group people are more vulnerable for cardiac disorders(12). In addition, Hepatitis B and HIV infection are related to ABO blood group among blood donors in Abidjan (13). In one more study, it was observed that AB blood group are more prone for

severity of dengue (14). Further, B blood group showed a significant pervasiveness of diabetes mellitus in Qatar population(15). In addition, the non O group is considered to be a risk factor for haemolytic anaemia. In another research work, commonness of periodontitis was higher in O group entity(16). Hence, contemplating the available literature, it is clear that prevalence of ABO blood group system and many ailments are interrelated. However, few studies reported that there is no association with ABO blood group system and various illnesses like colon and rectum, leukaemia, ulcerative colitis, joint disorders or congenital anomalies(17, 18). Hence, the association between ABO blood group system and susceptibility of the renal calculi would be of great clinical interest, we have evaluated the ABO and Rh blood group distribution in renal calculi patients.

Materials and methods:

This study was a case control study on incidence of ABO blood group system and Rh factor in renal calculi patients. This study was carried out at Chettinad Hospital and Research Institute, Chennai, India. After getting an approval from the institutional ethical committee, this study was initiated. A data collection was made from the medical case records of diagnosed renal calculi subjects (n = 150) who were admitted in the urology department between 1st June 2014 – 30th April 2015. From the case record, A, B, O and AB blood groups, Rh factor distribution in renal calculi subjects were collected and percentage distribution of above mentioned blood groups were analyzed.

Statistical analysis:

A, B, O and AB blood groups, Rh factor distribution frequencies among renal calculi subjects were compared by single variable non parametric Chi-square test using SPSS software for windows version 21.0 (Armonk, NY, IBM Corp.). The *p* value < 0.05 was considered to be statistically significant.

Results:

Incidence of renal calculi was O (37%) > B (36%) > A (19%) > AB (8%) blood groups among the study subjects (Bar chart 1). Individuals with A group found to be significantly having lower incidence (*p* = 0.03) when compared O and B group. Additionally, subjects with

AB group were observed to significantly at lower risk (*p* = 0.01) when compared with other three groups. Rh - ve individual showed a significant lower prevalence (*p* = 0.00) when compared to Rh + ve subjects (Bar chart 2). Further, A and AB – ve was observed to be the least affected with nil incidences among the study population (Bar chart 3).

Discussion:

In field of transfusion medicine, blood group system plays a significant role in blood transfusion, to find haemolytic disease of new born and to extract blood products for the management of various diseases. However, beyond its usage, research around the world is being carried out to find any susceptibility of particular disease to a specific blood group types. Available literature indicates that there is a strong association with the incidence of many pathological conditions. The first study relating to blood group with incidence of gastric cancer date back in 1953(19). From that day onwards, association of various diseases are being correlated with several diseases. Diseases like HIV(13), twenty types of cancer (20), diabetes(15), hypertension(21), coronary artery diseases(12), cerebero vascular diseases(22), dementia(23), rotator cuff tears(24), fracture pattern(25) and benign prostate hypertrophy(26) exhibit a strong association between their incidence and blood group system. However, scanty literature is available in relation to the blood group and incidence of renal calculi. Even though, there are several etiological factors for forming of renal calculi, elucidating the blood group association can pave a way as an additional preventive measure to avoid the occurrence as well as recurrence. Hence, this study was initiated to evaluate the association between ABO blood group and Rh factor to renal calculi. In the current study, it was found O, B and Rh +ve population are more prone for renal calculi. However, our study is in contrast with earlier report where the author found A > B > O > AB which could be due to difference in ethnicity (27). The probable reason for the results observed in the current study could be due to involvement of blood group antigen and its expression on the several cells and tissue(18). The other possible explanation could be due to variation in the normal

distribution of ABO and Rh factor itself, because in one study it was observed that distribution of Rh +ve and -ve distribution was 96% and 6% respectively(28). The other probable reason could be due to interference of metabolic factors with the formation of renal calculi and blood group(6).

Study limitations:

The current study was done in a smaller population that too in a specific ethnic population. Hence, future studies

in larger subjects in different regions would give up additional information about the association between ABO blood groups and renal calculi.

Conclusion:

This study is a strictly observational investigation. It gives an idea that O, B and Rh + ve individuals are more susceptible for renal calculi. Future studies are required to understand the molecular basis behind the blood group system and incidence of renal calculi.

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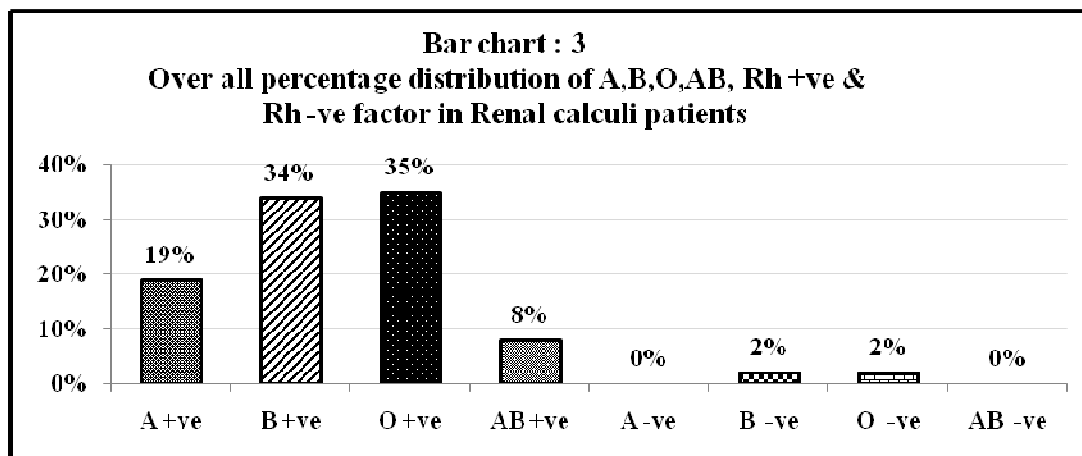
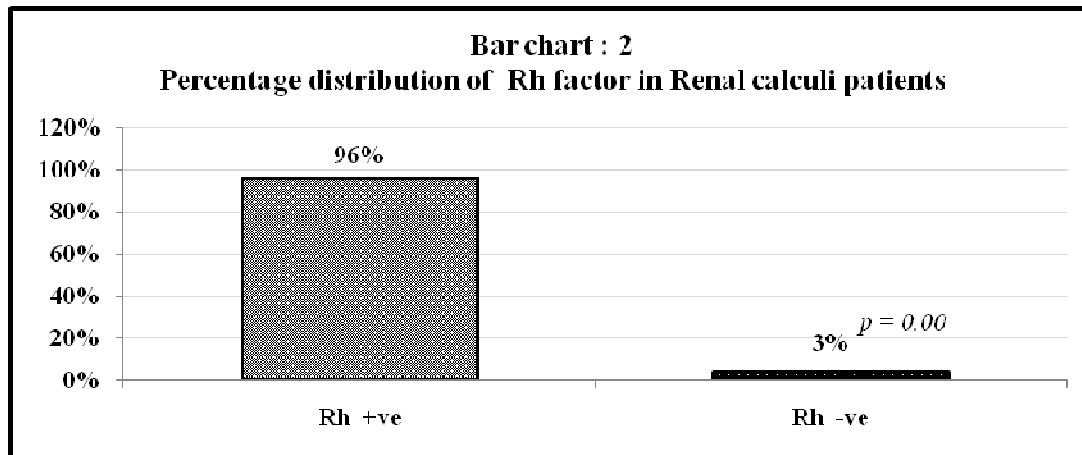
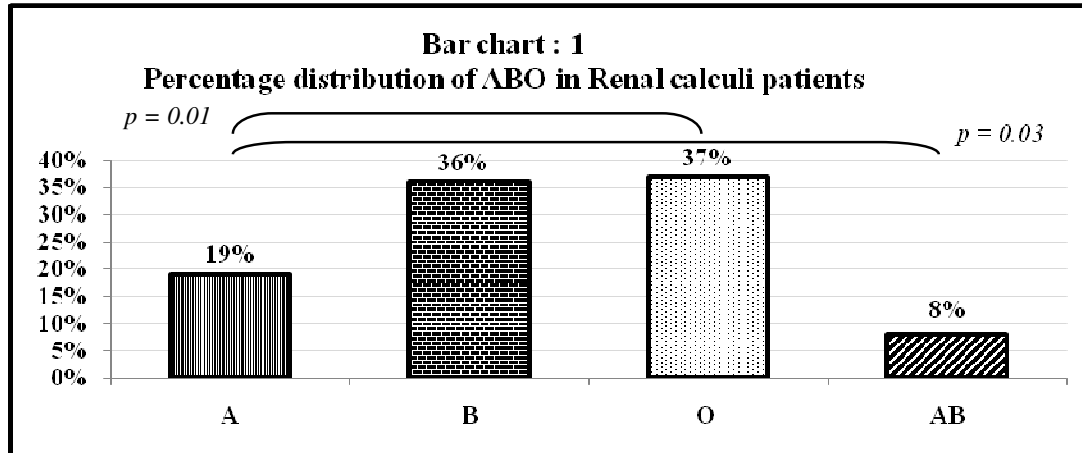
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Diagram 1, 2 and 3: Percentage distribution of ABO blood group and Rh factor in renal calculi patients



ABO and Rh factor percentage of distribution in renal calculi patients .

* indicates P value < 0.05 was considered to be significant.

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