An Analytical Study on Associated Type-II Diabetic Mellitus with ABO Rhesus Blood Groups

Ravi Kumar*1, Ravi Varma BH2, Vijayabhasker V3, Avinash Kulkarni3

1Department of SPM, Konaseema Institute of Medical Sciences Research Foundation, Amalapuram, Andhra Pradesh, India
2Department of Anesthesia, Konaseema Institute of Medical Sciences Research Foundation, Amalapuram, Andhra Pradesh, India
3Department of General Surgery, Meenakshi Academy of Higher Education and Research, Chennai, Tamil Nadu, India

ABSTRACT

Diabetes mellitus (DM) is a metabolic disorder categorized by hyperglycemia subsequent that faults of insulin emission and/or insulin cellular resistance and is the foremost reason for disease and mortality. The ABO blood collections frequently related by numerous illnesses through one blood group added repeatedly grown by the patients of a specific disease. The aim of this learning is to regulate the association among ABO & Rhesus blood groups and Type-2 diabetes mellitus in the local populace of Visakhapatnam. The present study is a hospital depended on the cross-sectional, case-control study, directed over a phase of six months in out-patient units of endocrinology department of a tertiary care hospital. An entire of 332 patients by Type-II DM and 200 age and sex harmonized healthy controls were included. In cases group, out of 332 patients 174(52.4%) were males (vs 113(56.5%) controls) and 158(47.5%) were females (vs 87(43.5%) controls) and about 289(87.04%) patients were found to be Rh+ve type (vs 178(89%) controls). About 91(27.4%) were found to be B-positive (vs 28(14%) controls), 87(26.2%) were O-positive (vs 69(34.5%) controls), and 73(22%) are A-positive (vs 62(31%) controls), 38(11.45%) are AB-positive (vs 19(9.5%) controls), 14(4.2%) are O-negative (vs 3(1.5%) controls), 11(3.3%) are A-negative (vs 10(5%) controls), 10(3.0%) are AB-negative (vs 3(1.5%) controls), 8(2.4%) are B-negative (vs 6(3%) controls). There is a suggestion among ABO antigens and Rhesus blood groups by Type-II DM. DM is more common in patients with B blood group and Rh-Positive.

INTRODUCTION

Diabetes mellitus (DM) is a public metabolic ailment categorized by increased levels of glucose in the blood due to defective production of insulin (Azizi et al., 2016). Type-II DM is considered to be the most major method of diabetes, accounting for about 90 percent of all cases globally (Devi and Padmini, 2015). India is the country with the largest number of diabetic people with around 32 million in 2015 and is predicted to be increased to 80 million by the year 2030 (Oner et al., 2016). Type-
II DM results in failure of multiple organ systems, thus leading to morbidity and mortality, imposing a major burden on the patient and the health care team (Mandal et al., 2018). Many studies were conducted to determine an imaginable suggestion among ABO and Rh blood groups and Type-II DM and reported that there is a strong relation between Type-II DM and ABO blood groups (Ganesan and Gani, 2014). However, very little research was conducted in India and therefore, our study aims to regulate the frequency and circulation of blood groups in patients by Type-II DM in Visakhapatnam (Bener and Yousaizfi, 2014).

Objectives Of The Study

Major objective

To investigate any association among ABO and Rhesus blood groups and Type-2 Diabetes mellitus (D.M) in the population of Visakhapatnam city visiting the training site (Kamil et al., 2010).

Minor objective

To regulate & comparison the occurrence & patterns of spreading of ABO & Rh blood groups in patients with Type-2 DM (cases) and in those without Type-2 DM (Controls).

MATERIALS AND METHODS

Study site

The study conducted in the Department of Endocrinology (Javed et al., 2017).

Study population

In our study, we included the out-patients identified by Type-II diabetes mellitus who attended the department of endocrinology (Aird et al., 1953).

Study period

Training is directed for a phase of six months, i.e., since November 2018 to April 2019.

Sample size

332 cases (Type-II Diabetic patients) and 200 healthy control subjects stayed designated by the study to equivalence spreading of ABO blood groups (Aird et al., 1954).

Study criteria Inclusion criteria

Focus of either sex (Males & Females) diagnosed with Type-II DM (age group of 20-60 years) who are attending the out-patient wards of the endocrinology department of KGH hospital were included in our study (Andersen and Lauritzen, 1960).

Exclusion criteria

1. In-patients and patients with other forms of diabetes, i.e., Type-1 DM as defined by ADA, gestational DM (Okon et al., 2008).

2. Patients who are aged below 20yrs & elderly (>60 yrs) and patients with a history of diabetic ketoacidosis is (DKA).

Study design

The present training is a prospective; hospital depended on cross-sectional case-control study.

Study approval

Prior endorsement for the training is gained by the Institutional Human Ethical Committee (IHEC) (Koley, 2008).

Study Procedure

Patient data of both the study groups (cases and controls), i.e., demographics, blood group, laboratory investigations, diagnosis of type-II DM (for cases) was obtained from patient’s medical records, and by interviewing the patients and their care takers (Stern et al., 1986).
### Table 1: Gender-wise distribution of the overall study population (cases and control groups)

| Study groups  | Males n (%) | Females n (%) | Total n (%) |
|---------------|-------------|---------------|-------------|
| Cases group   | 174 (52.4)  | 158 (47.5)    | 332 (62.4)  |
| Control group | 113 (56.5)  | 87 (43.5)     | 200 (37.6)  |
| Total         | 287         | 245           | 532         |

### Table 2: Age-wise distribution of study population.

| Age (years) | Cases group n(%) =332 | Control group n (%)=200 | Total |
|-------------|-----------------------|-------------------------|-------|
| 20-39       | 73 (21.98)            | 127 (63.5)              | 200   |
| 40-59       | 223 (67.16)           | 71 (35.5)               | 294   |
| 60-79       | 36 (10.84)            | 02 (1)                  | 38    |

### Table 3: Association of ABO and Rhesus blood groups in patients with Type-II diabetes mellitus (cases)

| Blood Group | Rhesus Factor       | Total |
|-------------|---------------------|-------|
| O           | Rhesus positive (+ve) | 87    |
| B           | Rhesus-ve           | 14    |
| A           | Rhesus positive (+ve) | 73    |
| AB          | Rhesus-ve           | 11    |
| Total       | 289                 | 43    |

### Table 4: Association of ABO and Rhesus blood groups in patients without Type-II diabetes mellitus (controls)

| Blood Group | Rhesus Factor       | Total |
|-------------|---------------------|-------|
| O           | Rhesus positive (+ve) | 69    |
| B           | Rhesus-ve           | 3     |
| A           | Rhesus positive (+ve) | 62    |
| AB          | Rhesus-ve           | 10    |
| Total       | 178                 | 22    |

### Table 5: Frequency distribution of blood groups in both cases and control groups

| S.No | Blood group | Cases n (%) | Controls n (%) | Row total |
|------|-------------|-------------|----------------|-----------|
| 1.   | B positive  | 91 (27.4)   | 69 (34.5)      | 160       |
| 2.   | 0 positive  | 87 (26.2)   | 62 (31)        | 149       |
| 3.   | A positive  | 73 (22)     | 28 (14)        | 101       |
| 4.   | AB positive | 38 (11.45)  | 19 (9.5)       | 57        |
| 5.   | 0 negative  | 14 (4.2)    | 10 (5)         | 24        |
| 6.   | A negative  | 11 (3.3)    | 6 (3)          | 17        |
| 7.   | AB negative | 10 (3)      | 3 (1.5)        | 13        |
| 8.   | B negative  | 8 (2.4)     | 3 (1.5)        | 11        |
| Total|             | 332         | 200            | 532       |
Upon physician's advice, Blood grouping was done by using Anti-Sera kit (Mediclone-B; Mediclone-A; Spanclone-Anti-D Monoclonal). Following this, blood grouping data of controls were taken from patients who attend out patient departments of Endocrinology and KGH-Blood bank. Statistics examination is completed after data is arrived into excel sheet and double-checked for errors (Expert Committee on the Diagnosis and Classification of Diabetes Mellitus, 2003).

RESULTS AND DISCUSSION

A total of 532 people was comprised into the study out of that 332 patients who met our study criteria by type-2 diabetes mellitus is included into the study as case population and 200 Non-diabetic people were included as a control population. Gender wise distribution of the overall study population has been tabularized in Table 1. Age-wise distribution of the study population has been tabulated in Table 2. Association of ABO & Rhesus blood groups in patients by Type-II diabetes mellitus in Case-control population has been tabulated in Tables 3 and 4, respectively. Frequency delivery of blood groups in both cases and control groups has been tabulated in Table 5. Prevalence of blood groups in males; females and overall study population has been shown in Figures 1, 2 and 3 respectively. Results of this study indicated that Rh positive is highly frequent in diabetes in which AB blood group is less frequent while those with blood groups B & O are more frequent and blood group 0 and B is added likely to get diabetes and people with AB group were less likely to get diabetes. In controls, those with blood groups O & A are more frequent and those with blood group AB is less frequent in a non-diabetic population.

CONCLUSIONS

We found that in Type-II Diabetes Mellitus patients, B positive blood group is more frequent than other blood groups, where as in Non-diabetic patients (control group) O positive blood group was found to be more frequent. Also, Rhesus +ve were found to be more predominant in both cases and controls and the findings of our study recommend that ABO antigens are related by Type-II DM. Diabetes mellitus is added common in individuals by B bloodgroup and Rh-positive (B-Positive).

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

Funding Support

The authors declare that they have no funding support for this study.

REFERENCES

Aird, I., Bentall, H. H., Mehigan, J. A., Roberts, J. A. F. 1954. The Blood Groups in Relation to Peptic Ulceration and Carcinoma of Colon, Rectum, Breast, and Bronchus. British Medical Journal, 2(4883):315–321.

Aird, I., Bentall, H. H., Roberts, J. F. 1953. Relationship Between Cancer of Stomach and the ABO Blood Groups. British medical journal, 1(4814):799–801.

Andersen, J., Lauritzen, E. 1960. Blood Groups and Diabetes Mellitus. Diabetes, 9(1):20–24.

Azizi, R., Manoochehry, S., Razavi-Ratki, S. K., Hosseini, S. M. S., Vakili, M., Namiranian, N. 2016. Distribution of ABO and Rh blood groups among diabetes type 2 patients in yazd diabetes research center (2015-2016). Iranian Journal of Diabetes and Obesity, 8(4):191–195.

Bener, A., Youssafzai, M. T. 2014. The distribution of the ABO blood groups among diabetes mellitus patients in Qatar. Nigerian Journal of Clinical Practice, 17(5):565–568.

Devi, M. R., Padmini, O. 2015. Distribution of classical ABO blood groups among type 2 diabetes mellitus patients: an analysis. Journal of Evolution of Medical and Dental Sciences, 4(34):5823–5827.

Expert Committee on the Diagnosis and Classification of Diabetes Mellitus 2003. Report of the expert committee on the diagnosis and classification of diabetes mellitus. Diabetes Care, 26(1):5–20.

Ganesan, K., Gani, S. B. 2014. Relationship between ABO, Rh blood groups and diabetes mellitus, obesity in Namakkal town, Tamilnadu. International Journal of Advances in Pharmacy, Biology and Chemistry, 3(4):995–998.

Javed, M., Akhtar, M. N., Muzaffar, S. 2017. Frequency of ABO and Rh blood groups in patients with diabetes mellitus. Pak J Med Health Sci, 11(1):114–116.

Kamil, M., Al-Jamal, H. A. N., Yusoff, N. M. 2010. Association of ABO blood groups with diabetes mellitus. Libyan Journal of Medicine, 5(1):48–47.

Koley, S. 2008. The Distribution of the ABO Blood Types in Patients with Diabetes Mellitus. The Anthropologist, 10(2):129–132.

Mandal, B., Shukla, R., Basu, A. K. 2018. Association of ABO blood groups with type-2 diabetes melli-
tus and its complications. *J Diabetes Metab Disord Control*, 5(1):1–7.

Okon, U. A., Antai, A. B., Osim, E. E., Ita, S. O. 2008. The relative incidence of diabetes mellitus in ABO/Rhesus blood groups in South-Eastern Nigeria. *Nigerian Journal of physiological sciences*, 23((1-2)).

Oner, C., Dogan, B., Telatar, B., et al. 2016. Frequency of ABO/Rhesus Blood Groups in Patients with Diabetes Mellitus. *J Coll Physicians Surg Pak*, 26(1):74–75.

Stern, M. P., Ferrell, R. E., Rosenthal, M., Haffner, S. M., Hazuda, H. P. 1986. Association between NIDDM, Rh blood group, and haptoglobin phenotype: results from the San Antonio Heart Study. *Diabetes*, 35(4):387–391.