

Frequency of Dyslipidemia and IHD in IGT Patients

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Impaired glucose tolerance (IGT) is often associated with macrovascular complications. People with IGT are 50% more likely to die of cardiovascular complications than people with normal blood glucose. This is a cross-sectional study, carried out in Rangpur Medical College Hospital, and Hypertension & Research center, Rangpur from July 2010 to June 2012. Patients fulfill the criteria of IGT were included for the study. During the study period a total of 116 patients were studied. 73.27% (85) patients had dyslipidemia. Among different forms of dyslipidemia high triglyceride (≥ 150 mg/dl) was found in 62.07% (72) and low HDL (≤ 40 mg/dl) was found 37.93% (44). High LDL (≥ 160 mg/dl) was found only in 6.03% (7). IHD was found in 34.48% (40) IGT patients and IHD was found more in dyslipidemia patients than those without dyslipidemia (38.8% vs 22.6%). Among different forms of dyslipidemia high triglyceride and low HDL is common in IGT patients. So, IGT patients should be screened for dyslipidemia and IHD.

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Key words: Dyslipidemia, IHD, IGT

Introduction

Impaired glucose tolerance (IGT) is a pre-diabetic state of dysglycemia that is associated with insulin resistance and increased risk of cardiovascular pathology. IGT may precede type 2 diabetes mellitus by many years. IGT is also a risk factor for mortality.¹

Impaired glucose tolerance (IGT) serves as a marker for the state of insulin resistance and predicts both large and small-vessel vascular complications, independent of a patient's progression to diabetes. Patients with IGT are at significantly increased risk for death and morbidity due to myocardial infarction, stroke, and large vessel occlusive disease. IGT is predictive of cardiovascular morbidity than impaired

fasting glucose, probably because it is a better surrogate for the state of insulin resistance. IGT is also independently associated with traditional microvascular complications of diabetes, including retinopathy, renal disease, and polyneuropathy. Inhibition of nitric oxide mediated vasodilation, endothelial injury due to increased release of free fatty acids and adipocytokines from adipocytes, and direct metabolic injury of endothelial and end-organ cells contribute to vascular complications. Early detection of IGT allows intensive diet and exercise modification, which has proven significantly more effective than drug therapy in normalizing postprandial glucose and inhibiting progression to diabetes.²

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IGT is often associated with a cluster of inter-related cardiovascular risk factors known as the Metabolic Syndrome, Insulin Resistance Syndrome or Syndrome X. These are high LDL-cholesterol (also called "bad" cholesterol) and low HDL-cholesterol (also called "good" cholesterol).

Cardiovascular complications such as increased atherosclerosis associated with type 2 diabetes begin to develop well before type 2 diabetes is diagnosed. By that time, macrovascular damage may already be well advanced.³

About 40-50% of people with IGT will develop type 2 diabetes (accompanied by increased risk of cardiovascular disease and microvascular complications) within ten years.

Metabolic insulin resistance syndrome is a critical factor in the pathogenesis of atherosclerosis and coronary heart disease in Indians. In a preliminary case-control study, 44 young patients (age < 40 years) with coronary heart disease (angina, myocardial infarction), not previously diagnosed to have diabetes mellitus, were recruited seven days to six weeks after the cardiac event (group I), and compared to 20 healthy subjects (group II). After recording history and anthropometric data, they were subjected to oral glucose tolerance test. Each group was divided into A and B subgroups according to the magnitude of tolerance. After excluding patients with the family history of diabetes mellitus, there were 13 (39%) and 3 (17%) patients with impaired glucose tolerance in groups I and II, respectively. Total cholesterol and low-density lipoprotein cholesterol levels were higher in group I as compared to group II ($p < 0.01$). Group IB showed highest mean values of total cholesterol, triglycerides, low-density

lipoprotein cholesterol and lowest level of high-density lipoprotein cholesterol as compared to other subgroups⁴. In 1999 to 2000, glucose tolerance status was determined in 10 428 participants of the Australian Diabetes, Obesity, and Lifestyle Study (AusDiab). After a median follow-up of 5.2 years, 298 deaths occurred (88 CVD deaths). Compared with those with normal glucose tolerance, the adjusted all-cause mortality hazard ratios (HRs) and 95% confidence intervals (CIs) for known diabetes mellitus and newly diagnosed diabetes mellitus were 2.3 (1.6 to 3.2) and 1.3 (0.9 to 2.0), respectively. The risk of death was also increased in those with impaired fasting glucose (HR 1.6, 95% CI 1.0 to 2.4) and impaired glucose tolerance (HR 1.5, 95% CI 1.1 to 2.0). Sixty-five percent of all those who died of CVD had known diabetes mellitus, newly diagnosed diabetes mellitus, impaired fasting glucose, or impaired glucose tolerance at baseline.⁵

Impaired glucose tolerance, an intermediate metabolic state between normal glucose and diabetes characterized by nonfasting glucose levels between 7.8 to 11.0 mmol/L, is associated with an increased stroke risk in patients with coronary heart disease. In Dutch TIA trial study, 2004 shows that during 2.6 years follow-up, 9% experienced a stroke and 6% a myocardial infarction or cardiac death. Stroke risk was nearly doubled in patients with impaired glucose tolerance compared with those with normal glucose levels (hazard ratio 1.8, 95% CI, 1.1 to 3.0). Impaired glucose tolerance is an independent risk factor for future stroke in nondiabetic patients with TIA or minor ischemic stroke.⁶

Methods

This is a descriptive cross-sectional study, carried out in Rangpur Medical College

Hospital, and Hypertension & Research center, Rangpur from July 2010 to June 2012. Patients fulfill the criteria of IGT were included for the study. Systemic randomized sampling method was followed as per

Inclusion and exclusion criteria and sample size was 116. The data were analyzed by using the computer software SPSS program. IGT value was taken from following WHO criteria.

Glucose levels	NORMAL		impaired fasting glycaemia (IFG)		impaired glucose tolerance (IGT)		Diabetes Mellitus (DM)	
	Fasting	2hrs	Fasting	2hrs	Fasting	2hrs	Fasting	2hrs
(mmol/l)	<6.1	<7.8	≥ 6.1 & <7.0	<7.8	<7.0	7.8-11.0	≥7.0	≥11.1
(mg/dl)	<110	<140	≥110 & <126	<140	<126	140-199	≥126	≥200

Results

A total of 116 patients were included in the study. The study population was divided into group I and group II. Group I: IGT subjects with dyslipidemia and Group II: IGT subjects with normal lipid profile.

Table I shows IHD patients were found in 33(38.8%) and 7(22.6%) in group I and group II respectively. The difference was not statistically significant ($P>0.05$) between two groups in chi square test.

Table I: Distribution of the study patients according to IHD (n=116).

	Group I (n=85)		Group II (n=31)		<i>p</i>
	n	%	n	%	
IHD					
Present	33	38.8	7	22.6	0.103 ^{ns}
Absent	52	61.2	24	77.4	

ns= not significant

P value reached from chi-square test

Triglyceride ≥ 150 mg/dl was found in 72(62.07%) and <150 mg/dl was found in 44(37.93%). Cholesterol ≥ 200 mg/dl was

found in 28(24.14%) and <200 mg/dl was found in 88(75.86%). HDL <40 mg/dl was found 44(37.93%) and ≥ 40 mg/dl in 72(62.07%). LDL ≥ 160 mg/dl was found in 7(6.03%) and <160 mg/dl was found 109(93.97%).

Table II: Distribution of the study patients according to TG, TC, HDL and LDL (n=116). (According to ATP-III & American Heart Association)

	Number of patients	Percentage
Triglyceride (mg/dl)		
≥ 150	72	62.07
<150	44	37.93
Cholesterol (mg/dl)		
≥ 200	28	24.14
<200	88	75.86
HDL (mg/dl)		
≥ 40	72	62.07
<40	44	37.93
LDL (mg/dl)		
≥ 160	7	6.03
<160	109	93.97

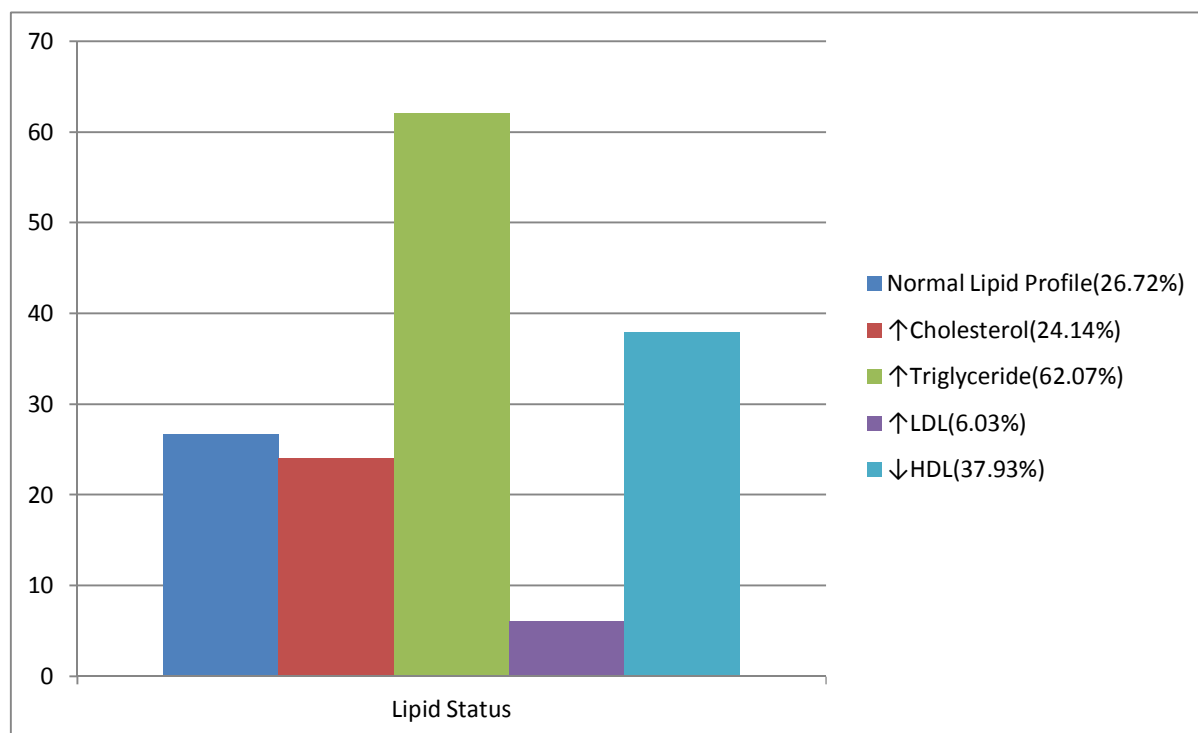


Fig 1. Bar diagram showing the lipid status of the study subjects

Discussion

This descriptive study was carried out with an aim to find out the Frequency of dyslipidemia and IHD in IGT patients. A total number of 116 consecutive patients with impaired glucose tolerance (IGT), out of which 85 patients having dyslipidemia was considered as group I and rest 31 had normal lipid profile was considered as group II, who came in Hypertension & Research Centre, Rangpur and Rangpur Medical College Hospital (RpMCH), Rangpur, during July 2010 to June 2012 were enrolled in this study.

In this current study it was observed that the mean triglyceride was found 241.81 ± 136.19 mg/dl in group I and 118.32 ± 28.4 mg/dl in group II. The mean cholesterol was found 187.81 ± 36.02 and 156.26 ± 21.08 mg/dl in group I and group II respectively. The mean HDL was found 42.86 ± 9.14 mg/dl in group I and 48.23 ± 6.63 mg/dl in group II. The mean

LDL was found 105.56 ± 33.28 mg/dl and 95.84 ± 29.36 mg/dl in group I and group II respectively. The mean triglyceride, cholesterol and LDL were significantly ($P < 0.05$) higher in group I, however, the mean HDL was significantly ($P < 0.05$) higher in group II. In a study Udawat, Goyal⁷ and Maheshwari⁷ (2001) found that dyslipidemia was present in 89% of diabetic patients with LDL hyperlipoproteinemia in 76%, low HDL dyslipidemia in 58%, hypertriglyceridemia in 22% patients. In the present study it shows that 73.28% of IGT patients are dyslipidemic with high LDL level in 6.03%, low HDL in 37.93% and hypertriglyceridemia in 62.07%. The both study is comparable in triglyceride and HDL level but not with LDL level.

In this present series it was observed that 38.8% and 22.6% patients had IHD in group I and group II respectively, that was higher in

group I, but not significant ($p > 0.05$). In this series it was observed that 62.07% patients had Triglyceride >150 mg/dl, 24.14% had Cholesterol >200 mg/dl, 37.93% had low HDL <40 mg/dl, 6.03% had LDL >160 mg/dl. Cankurtaran⁸ et al. (2007) showed Low HDL-C levels in 46.0% and high LDL-C levels in 25.0%. In another study, Sherry et al.⁹ (2005) found total cholesterol 18.0%, LDL 12.0%, triglycerides 10.0% and low HDL 47.0%, which are comparable with the current study.

A Fontbonne et al¹⁰ shows that Coronary heart disease is significantly associated with hypertriglyceridemia. In current study it shows that total 40 patients have ischemic heart disease out of 116 IGT patients and 26 of them have hypertriglyceridemia (65%) which is comparable to the study.

Conclusion

This study provided some important information of IGT patients with relationship with dyslipidemia and IHD. This cross sectional study showed triglyceride, Cholesterol, and LDL were significantly ($P < 0.05$) higher and low HDL in patients having IGT. IHD also higher in patients having dyslipidemia. So every IGT patients should be screened for the presence of dyslipidemia and Ischemic heart disease.

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References

1. WHO Diabetes criteria, 1999.
2. Diabetes Journal 2003, 52:2867-2873.
3. Chow WC, Tai ES, Lian SC., et al. Singapore Med J. 2007 Aug;48(8): 752-7.
4. Misra A, Pandey RM, Devi JR, Sharma R, Vikram NK, Khanna N. High prevalence of diabetes, obesity and dyslipidaemia in urban slum population in northern India. Int J Obes Relat Metab Disord. 2001 Nov;25(11):1722-9.
5. Elizabeth L.M. Barr, MPH et al; Diabetes Care 2005 Jun; 28(6): 1490-1492.
6. Sarah E. Vermeer et al., New England Journal of Medicine, March 27, 2003: 'Silent Brain Infarcts and the Risk of Dementia and Cognitive Decline.'
7. Udawat, H., Goyal, R.K., Maheshwari, S., 2001. Coronary Risk and Dyslipidemia in Type 2 Diabetic Patients. J Assoc Physicians India, 49, pp. 970-3.
8. Cankurtaran M, Tayfur O et al. Acta Gastroenterol Belg. 2007 Jul-Sep;70(3):253-9.
9. Sherry N, hassoun A., et al. j Pediatr Endocrinol Metab. 2005 Nov;18(11):1063-71.
10. Fontbonne A et al. Hypertriglyceridaemia as a risk factor of coronary heart disease mortality in subjects with impaired glucose tolerance or diabetes. Results from the 11-year follow-up of the Paris Prospective Study', Diabetologia. 1989 May;32(5):300-4.