



Correlation of Gallbladder Volume to Autonomic Neuropathy in Diabetics

Authors

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Introduction

- Diabetes mellitus is most common endocrine disorder in humans characterized by chronic hyperglycemia due to defects in insulin secretion, insulin action or both
- Prevalence of diabetes in adults in India is around 8.9%
- Complications of diabetes can be divided into acute & chronic complications
- Acute complications include diabetic ketoacidosis, non ketotic hyperosmolar state, hypoglycemia.
- Chronic complications can be divided into microvascular & macrovascular complication
- Microvascular complications include eye disease (retinopathy, macular edema, cataracts), neuropathy (sensory & motor, autonomic), nephropathy
- Macrovascular complications include coronary artery disease, peripheral artery disease, cerebrovascular disease
- Diabetes is the commonest cause of autonomic peripheral neuropathy. A broad spectrum of symptoms affecting cardiovascular, gastrointestinal, urogenital,

thermoregulatory, sudomotor & pupillomotor function can occur

- Gall bladder involvement in diabetic autonomic neuropathy occurs in form of increased gall bladder volume & impaired gall bladder contraction
- Vagal parasympathetic fibers maintain gall bladder tone & influence its emptying
- Hence gall bladder dysfunction may occur in autonomic neuropathy
- Due to impaired contraction, stasis occurs and results in gall stone formation
- Therefore gall bladder function should be routinely evaluated in diabetic patients

Aim

To assess the gall bladder volume in patients with type 2 diabetes mellitus and its comparison in relation to autonomic neuropathy

Materials and Methods

Source of Study: The material of this study comprised of forty patients of type 2 diabetes mellitus admitted in GEMS hospital, Srikakulam, Andhra Pradesh.

Study Designs: Cross sectional study

Study Period: November 2019 – August 2020

Duration of Study: 10 months

Inclusion Criteria

1. Duration of diabetes > 5years
2. Well compliant to anti diabetic medication

Exclusion Criteria

1. Cardiac arrhythmias
2. Patients on anti HTN medication which interferes with autonomic function
3. Obese patients, pregnant ladies
4. Past history of CVA
5. Patients with HIV infections

Collection of Data

This is a cross sectional study

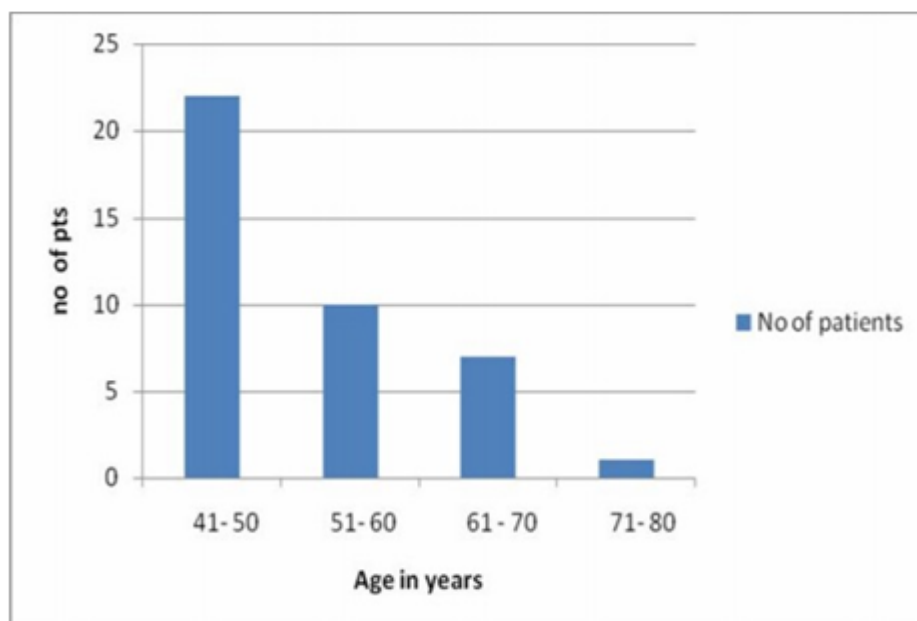
- Patients were investigated with RBS, FBS, PPBS, HbA1c for good glycemic control
- FBS (90-130mg %), PPBS (<180mg%),

HbA1c(<7%) was taken for deciding glycemic control

- Ultrasonography abdomen was done to assess the gall bladder volume
- Cardiac autonomic neuropathy was tested by BP response to standing, HR variation from supine to standing, HR variation to deep breathing & BP response to sustained handgrip
- Other investigations like haemoglobin, TLC, DLC, ESR, urine routine, ECG, blood urea, serum creatinine were done
- Statistical analysis was done using student t test and p value<0.05 was considered significant

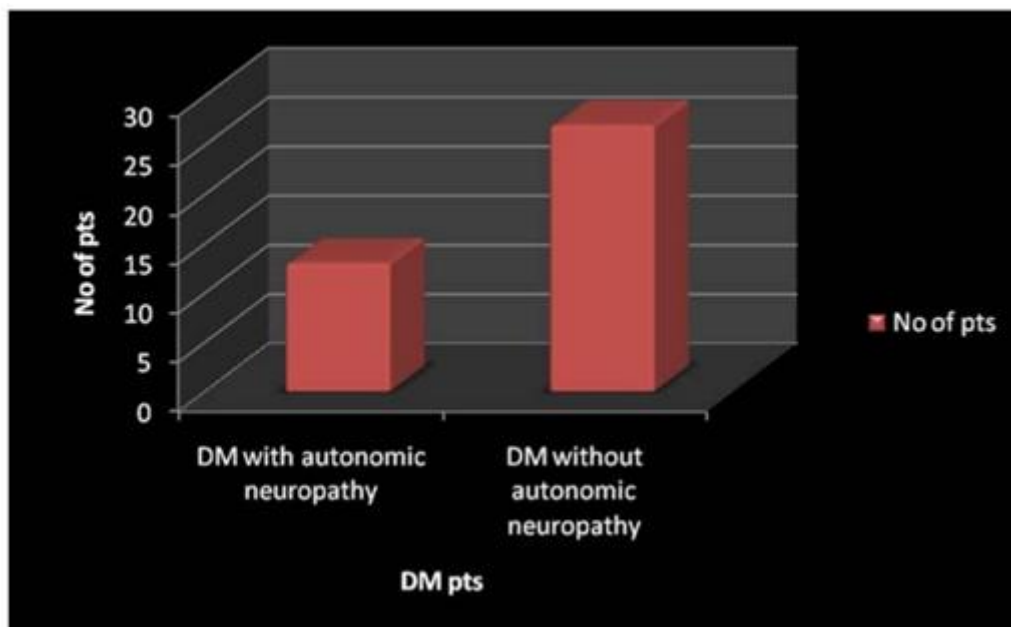
Age Distribution

Age in years	No of patients	Percentage
41- 50	22	55
51- 60	10	25
61 - 70	7	17.5
71- 80	1	2.5
Total	40	100



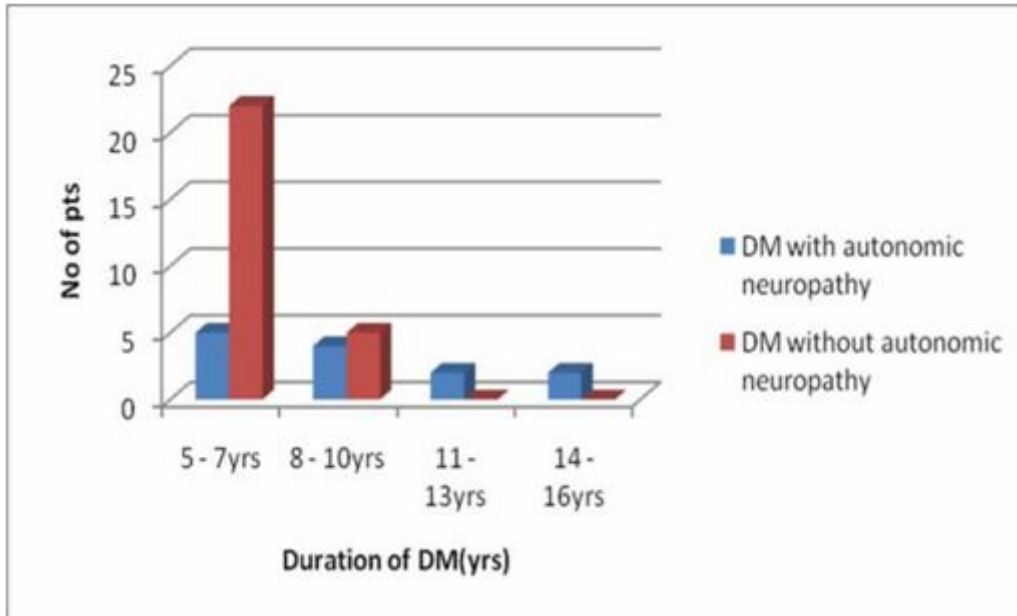
Diabetics With & Without Autonomic Neuropathy

	No of pts	Percentage
DM with autonomic neuropathy	13	22.5
DM without autonomic neuropathy	27	67.5
Total	40	100



Duration of Diabetes Mellitus

Duration of DM (yrs)	DM with autonomic neuropathy	DM without autonomic neuropathy
5 - 7yrs	5	22
8 - 10yrs	4	5
11 - 13yrs	2	0
14 - 16yrs	2	0
Total	13	27



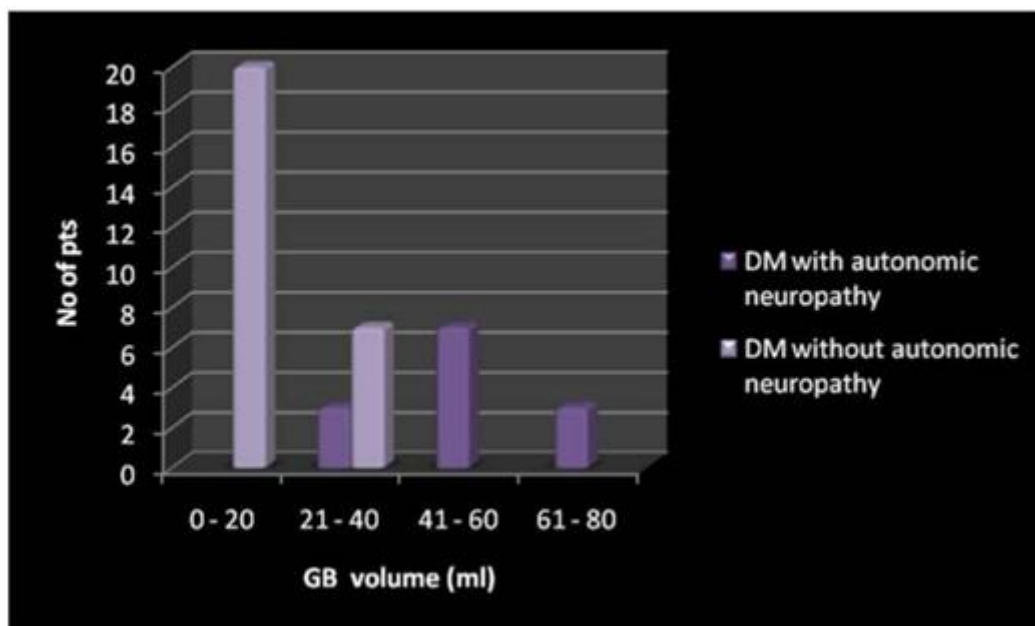
FBS(mg%)	DM with autonomic neuropathy	DM without autonomic neuropathy
71 - 80	1	1
81 - 90	1	3
91 - 100	1	9
101 - 110	4	11
111 - 120	5	4
121 -130	1	0
Total	13	27

++•BS(mg%)	DM with autonomic neuropathy	DM without autonomic neuropathy
131 - 140	0	0
141 - 150	0	1
151 - 160	1	2
161 - 170	6	8
171 - 180	6	16
Total	13	27

HbA1c	DM with autonomic neuropathy	DM without Autonomic neuropathy
6.1 - 6.2	1	1
6.3 - 6.4	1	4
6.5 - 6.6	4	6
6.7 - 6.8	4	7
6.9 -7	3	9
Total	13	27

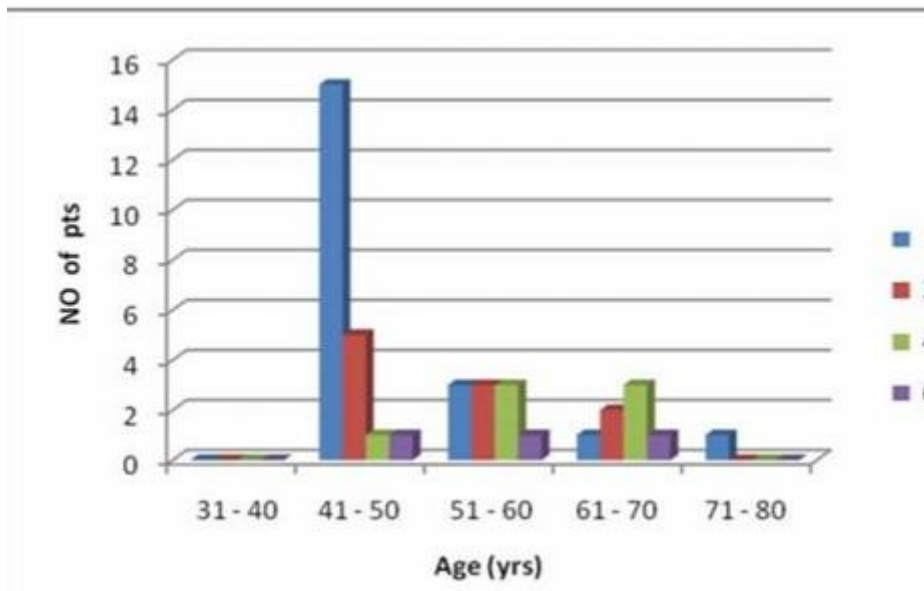
Gall Bladder Volume

GB volume	DM with autonomic neuropathy	DM without autonomic neuropathy
0 - 20	0	20
21 - 40	3	7
41 - 60	7	0
61 - 80	3	0
Total	13	27

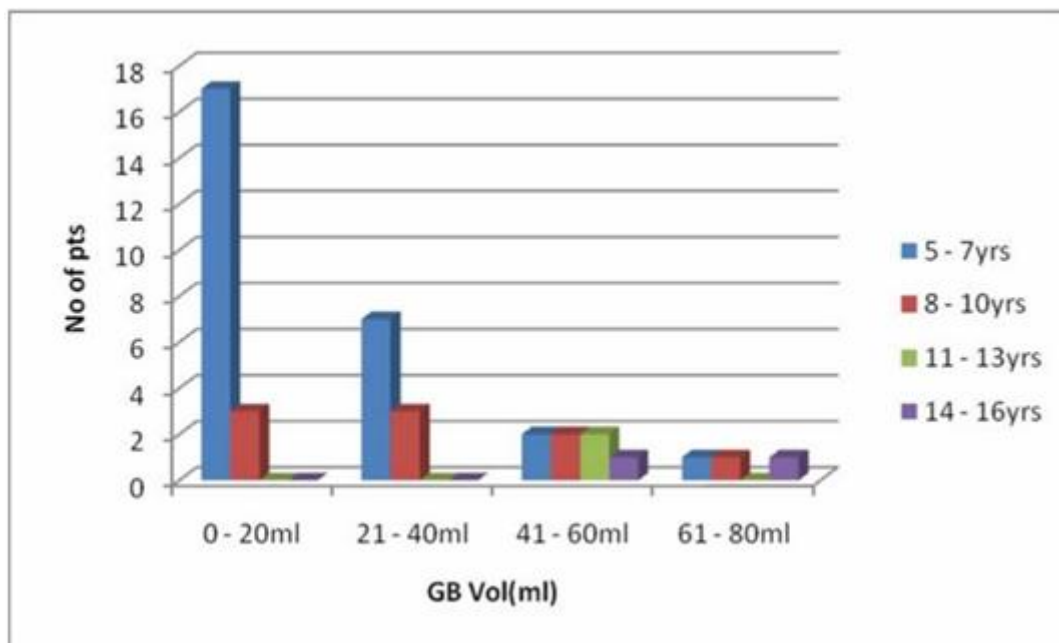


Gall Bladder Volume with Age of the Patients

GB Volume(ml)	Age (yrs)				
	31 - 40	41 - 50	51 - 60	61 - 70	71 - 80
0 - 20ml	0	15	3	1	1
21 - 40ml	0	5	3	2	0
41 - 60ml	0	1	3	3	0
61 - 80ml	0	1	1	1	0
Total	0	22	10	7	1



Gall Bladder Volume with Duration of Diabetes



Summary

- Diabetic neuropathy in one of the major complications of long standing diabetes
- Neural control of gall bladder emptying is mediated by both sympathetic & parasympathetic, the former increases the gallbladder contractility & later causes relaxation
- This is a cross sectional study of 40 diabetic patients
- Gall bladder volume was evaluated by ultrasonography & compared with& without autonomic neuropathy
- Cardiac autonomic neuropathy was tested in all 40 patients with simple bed side tests
- Patients age ranged from 41-76yrs. Majority of patients were in 41-50 yrs age group. Mean age was 52.60 +/- 8.145yrs
- The duration of diabetes ranged from 5-15yrs with a mean duration of 7.28 +/- 2.50yrs. Patients with cardiac autonomic neuropathy had longer duration of diabetes than without cardiac autonomic neuropathy
- Patients with cardiac autonomic

neuropathy had larger gall bladder volume (52.54 +/- 14.234ml) than patients without cardiac autonomic neuropathy (18.19 +/- 4.35ml)

Conclusion

- The gall bladder volume was higher in diabetics with autonomic neuropathy when compared with diabetics without autonomic neuropathy
- Gall bladder volume was more with higher age group patients
- The age & duration of diabetics were higher in diabetics with autonomic neuropathy
- A significant association of autonomic neuropathy with increase in gall bladder volume has been demonstrated

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