Ileal Interposition with Sleeve gastrectomy/ diverted sleeve gastrectomy for treatment of type 2 diabetes

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Presentation Layout

- Background
- Introduction
- Patient selection
- Patient demography
- Outcomes
- Methods
- Postoperative results
- Complications
- Conclusion

Operative cure for Diabetes?

- Bariatric surgery should be considered for adults with BMI > 35 kg/mt^2 and type 2 DM, especially if the diabetes is difficult to control with lifestyle and pharmacologic therapy

Diabetes care. 2009; 32: 513-61.

- T2DM and BMI: ≥ 35
- T2DM and BMI: 30-35
  - Inadequate control by optimal medical regimen
  - presence of other major cardiovascular disease risk factors.

Diabet Med. 2011; 28: 628–642.

The NEW ENGLAND JOURNAL of MEDICINE

EDITORIAL

Surgery or Medical Therapy for Obese Patients with Type 2 Diabetes?

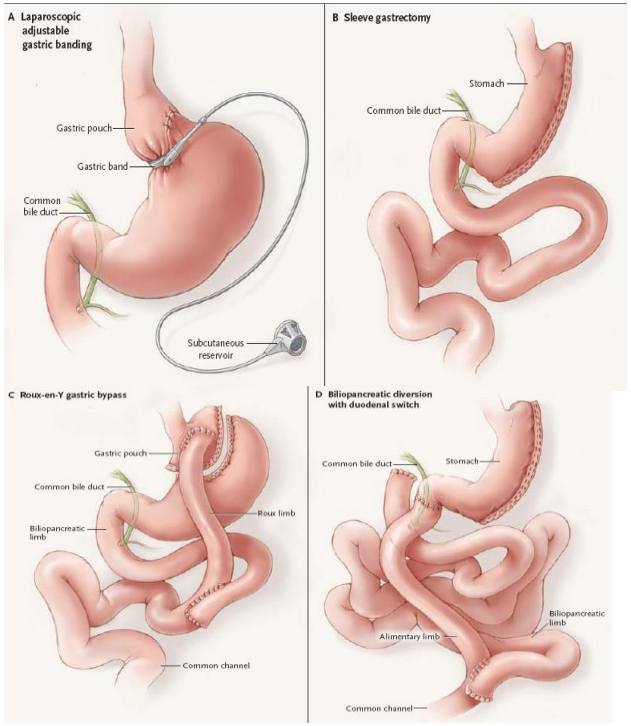
- **Bariatric surgery might well be considered earlier in the treatment of obese patients with type 2 diabetes.**

- **They should not be seen as a last resort**

NEJM. 2012; 366 (17): 1567- 76.

Introduction

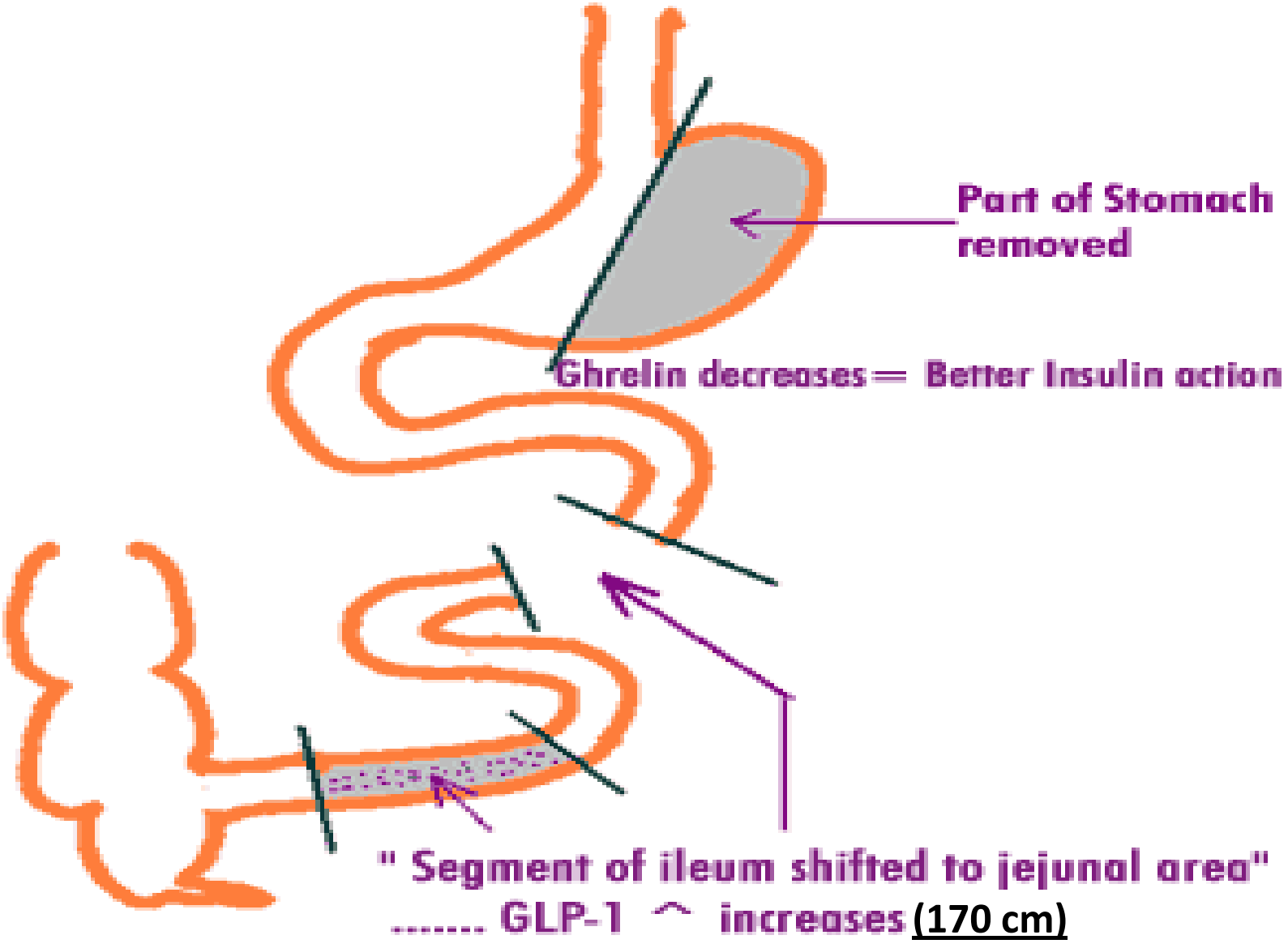
- Bariatric Surgery Types
  - Restrictive
    - Gastric banding
    - Sleeve gastrectomy (SG)
  - Malabsorptive
    - Biliopancreatic Diversion
    - Jejunoileal bypass
    - Gastric bypass (Roux-n-Y)



  - Novel
    - SG/ DSG with Ileal interposition (II)

- Bariatric surgery offers cure of Diabetes in of 80- 90 % cases
- II+SG, a novel procedure offers good metabolic benefit without causing any malabsorption

Surgical procedure- Sleeve Gastrectomy with Ileal Interposition



Patient selection

Inclusion Criteria

- Patients with Type 2 diabetes mellitus of ≥ 1 year duration
- Age between 25 and 70 years
- BMI ≥22 kg/m^2
- Post meal C-peptide > 1.5 ng/ml

Exclusion criteria

- Type 1 diabetes
- Diabetes with undetectable fasting C-peptide
- Positive urine ketones
- Pregnancy
- CKD (GFR < 30ml/min)
- Coexisting severe hepatic, pulmonary, cardiovascular disorder.

Patient Demography

No of patients (n)	43 (M:F=25:18)
Mean age of patients	47.2 ± 8.2 years (range- 29-66yr)
Mean pre-op BMI	33.3 ± 7.8 kg/m^2
Mean duration of diabetes	10.1 ± 9.2 years
Mean preop fasting C-peptide	2.8± 1.3 ng/ ml
mean preop postprandial C-pep	4.8± 2.8 ng/ml
Mean preop HOMA-IR	22.3 ± 3.7
Mean preop FBS	184.8± 50.2 mg/dl
Mean preop PLBS	292.6± 85.5 mg/dl
Mean preop HbA1C	9.6± 2.1 %

Patient Demography

- **Number of Patients with**
  - **BMI < 27 kg/m^2- 13 (30%)**
  - **BMI > 27 kg/m^2- 30 (70%)**

- **Number of patients with**
  - **Hypertension- 30 (70%)**
  - **Dyslipidemia- 20 (46%)**
  - **Microalbuminuria- 18 (42%)**

- **Number of patients requiring**
  - **≥ 2 OHA- 21 (49%)**
  - **Insulin ± OHA-22 (51%)**

Outcomes

Primary outcomes

- **Remission of type2 DM (no drug, HbA1C < 6.5%)**

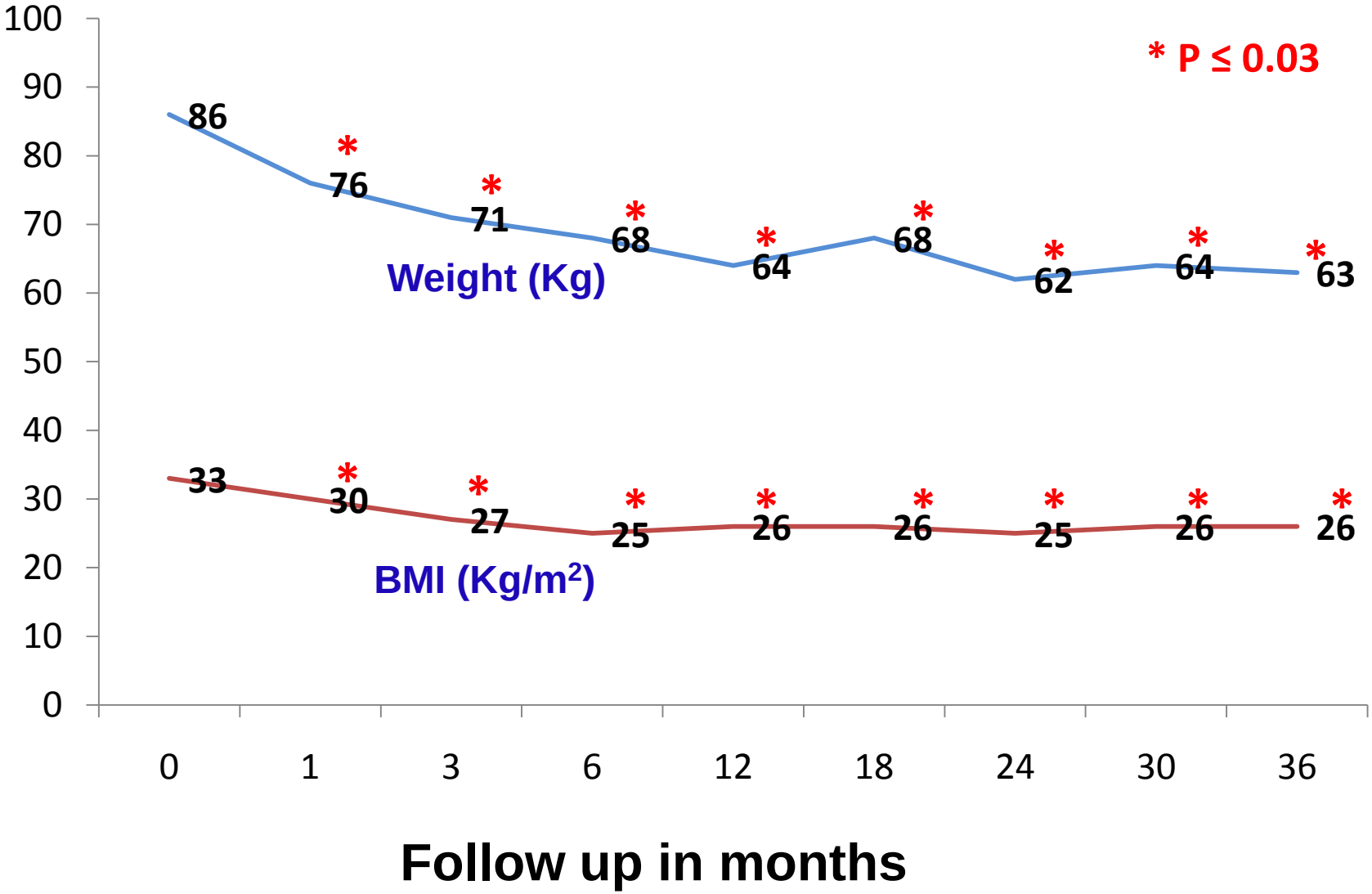
Secondary outcomes

- **Reduction in OHA/ insulin requirement**
- **Fall in BMI, metabolic syndrome parameters**
- **Decrease in microalbuminuria**

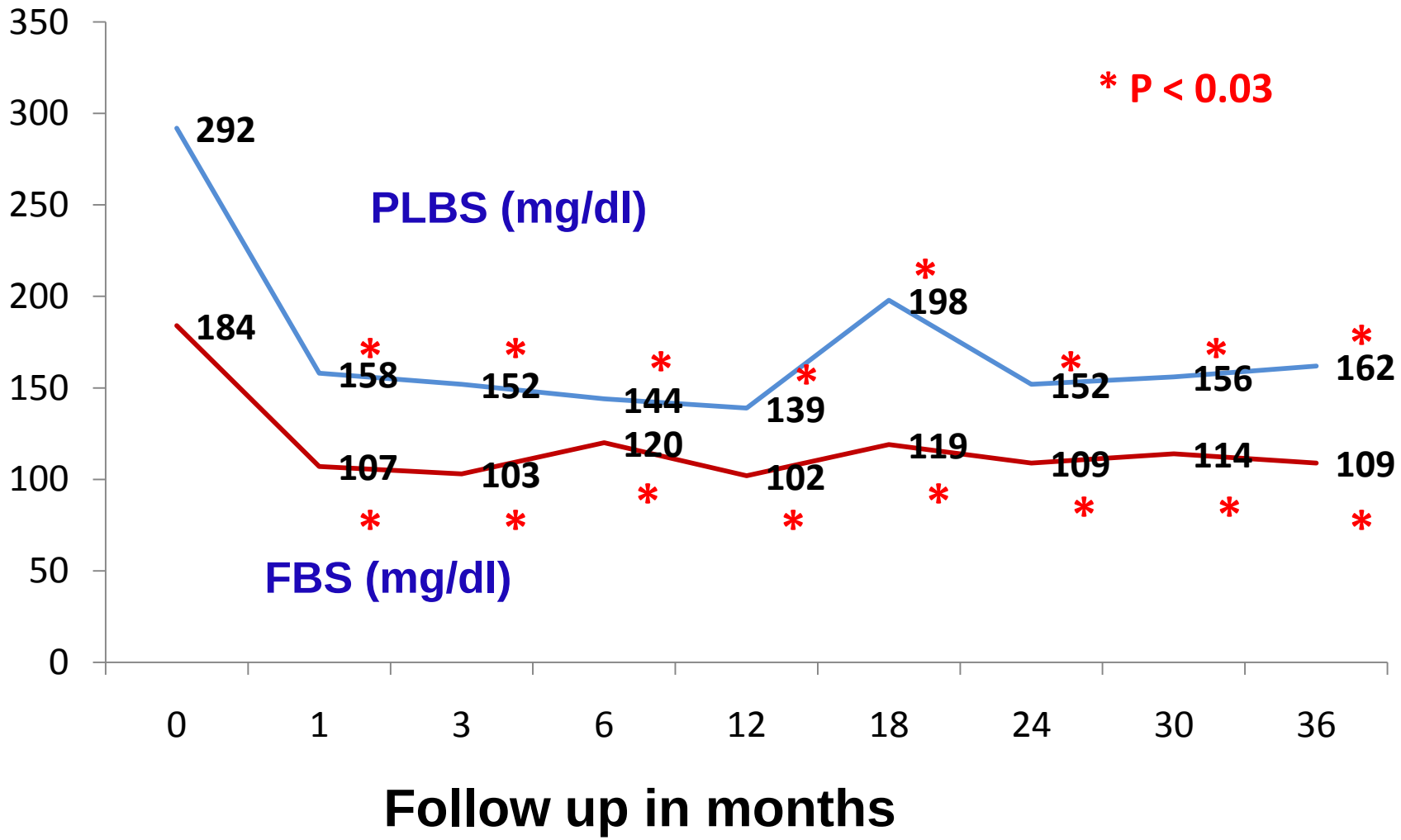
Results: follow up data

Period	n =	Follow up data available for patients n (%)
1 month	42	35 (83%)
3 months	37	29 (78%)
6 months	29	20 (68%)
12 months	16	10 (63%)
18 months	10	8 (80%)
24 months	6	5 (83%)
30 months	5	4(80%)
36 months	5	4 (80%)

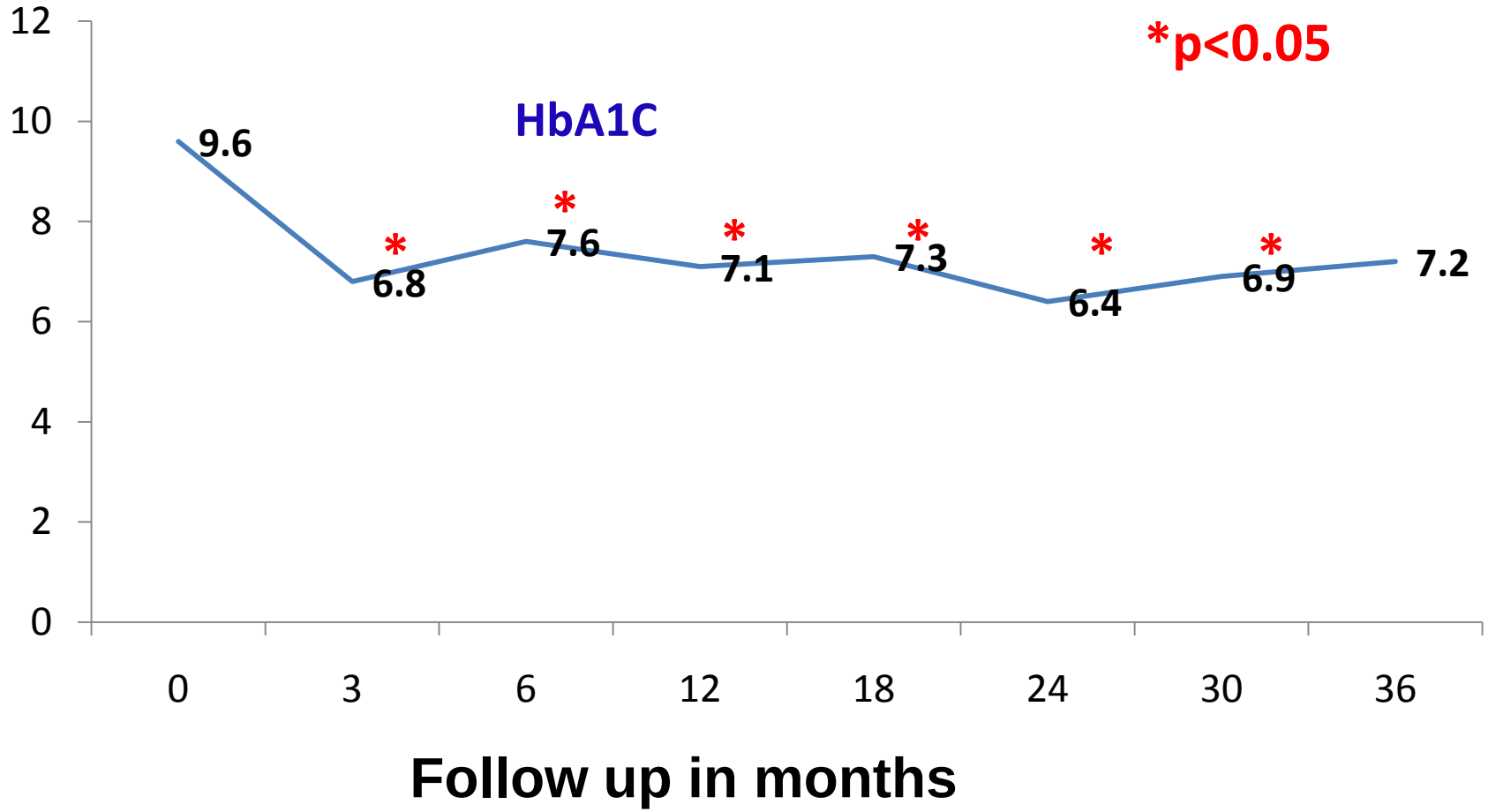
Post operative mean weight and BMI



Post operative mean FBS & PLBS



Post operative mean HbA1C



Glycemic improvement disproportionate to Wt reduction

	Percentage decrease in parameters		
Follow up	HbA1C	Weight	BMI
6 months	24%	21%	20%
12 months	28%	25%	17%
24 months	36%	28%	20%
36 months	34%	26%	19%

POSITION STATEMENT

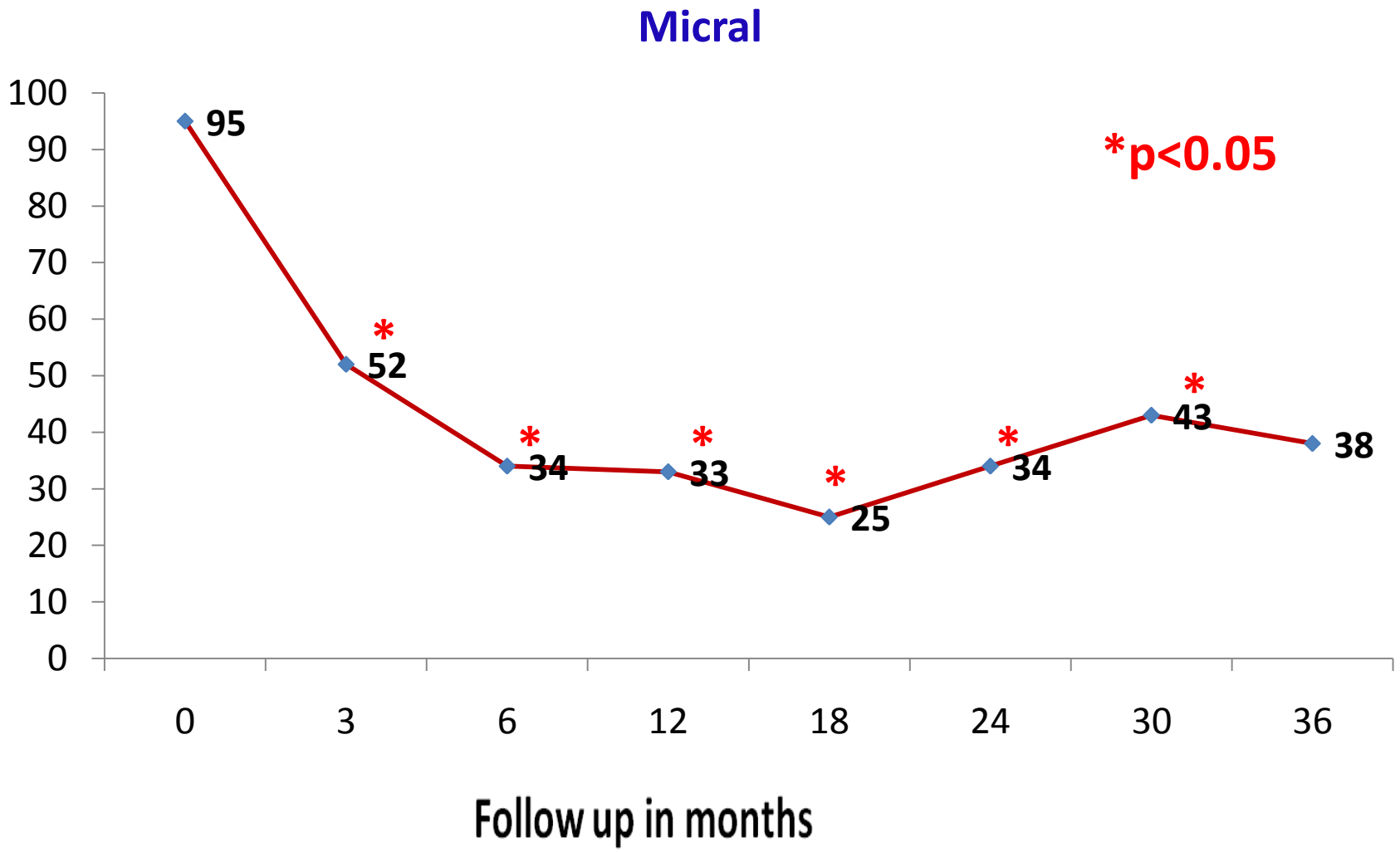
Standards of Medical Care in Diabetes—2009

AMERICAN DIABETES ASSOCIATION

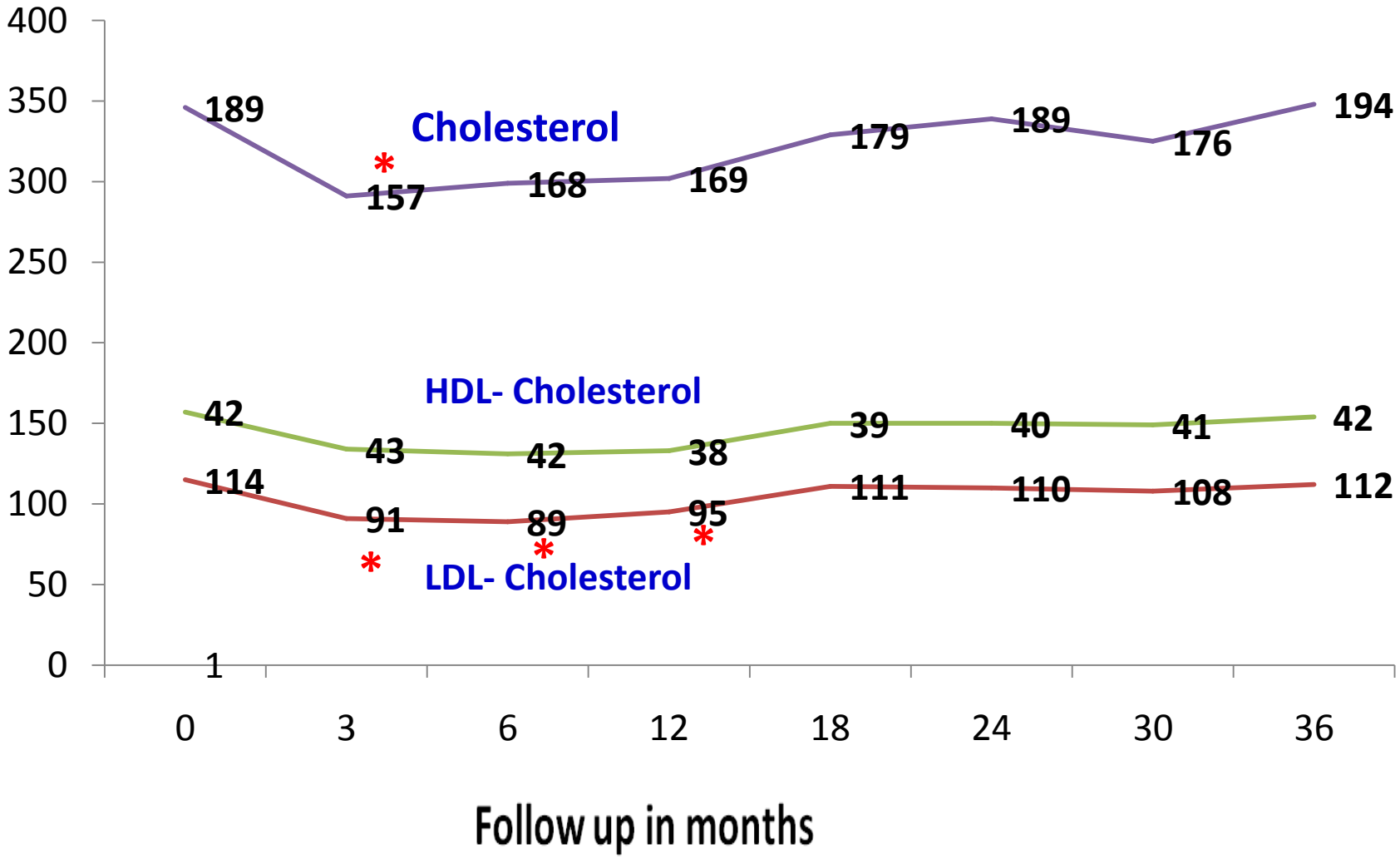
"There is increasing evidence that intestinal bypass procedures may have glycemic effects that are independent of, and additive to their effects on weight"

ADA 2009 Standards of Care

Post operative mean Microalbuminuria



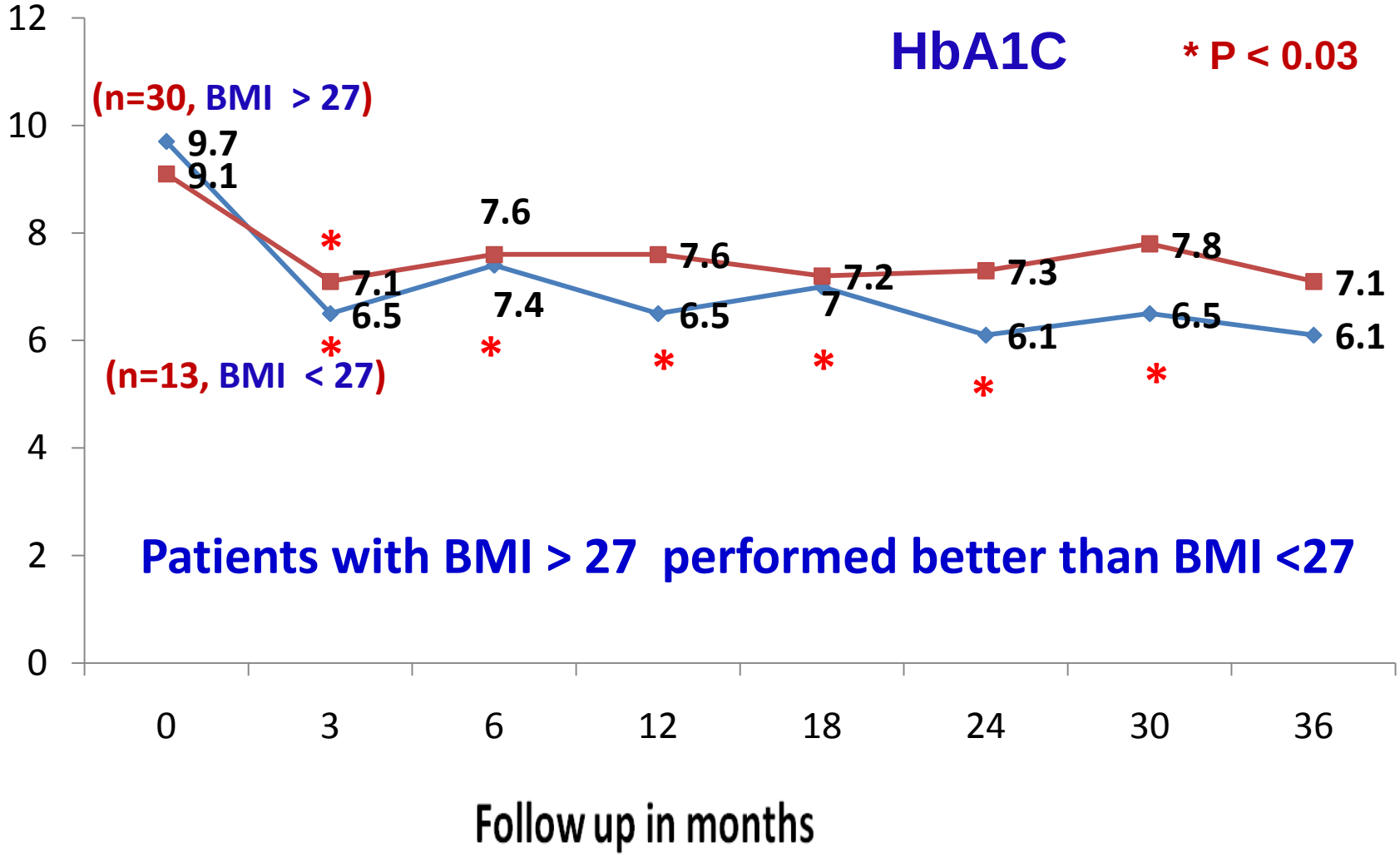
Post operative mean Lipid



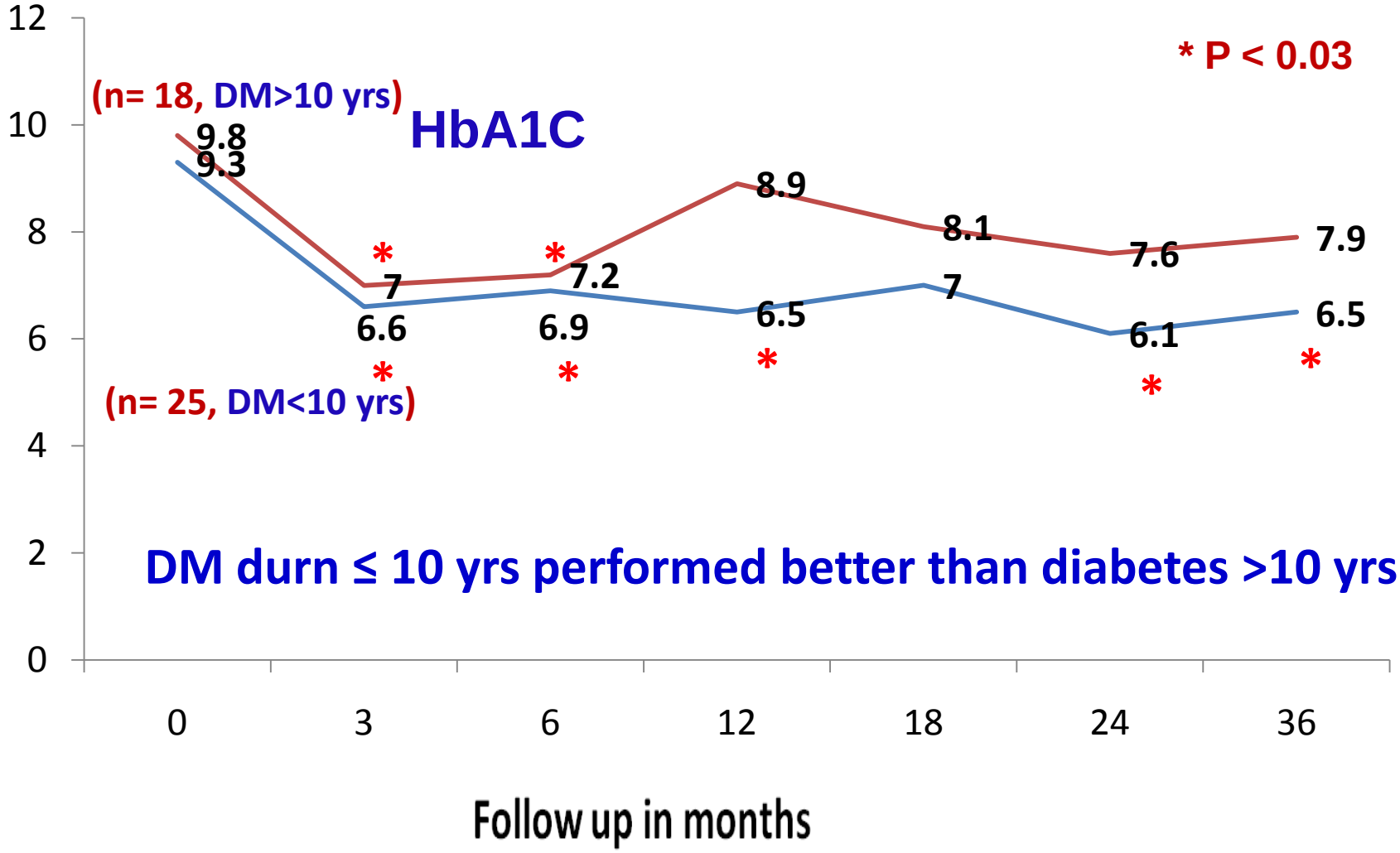
Remission data for Diabetes and Hypertension * P < 0.04

Period	Patients with remission in Diabetes- N (%)	Patients with remission in Hypertension- N(%)
3 months	8/37 (22%)	25/28 (89%) *
6 months	12/29 (42%) *	16/18 (89%) *
12 months	8/16 (50%) *	8/10 (80%) *
18 months	6/11 (55%) *	7/10 (70%) *
24 months	5/6 (83%) *	5/6 (83%) *
36 months	4/5 (80%) *	3/3 (100%) *

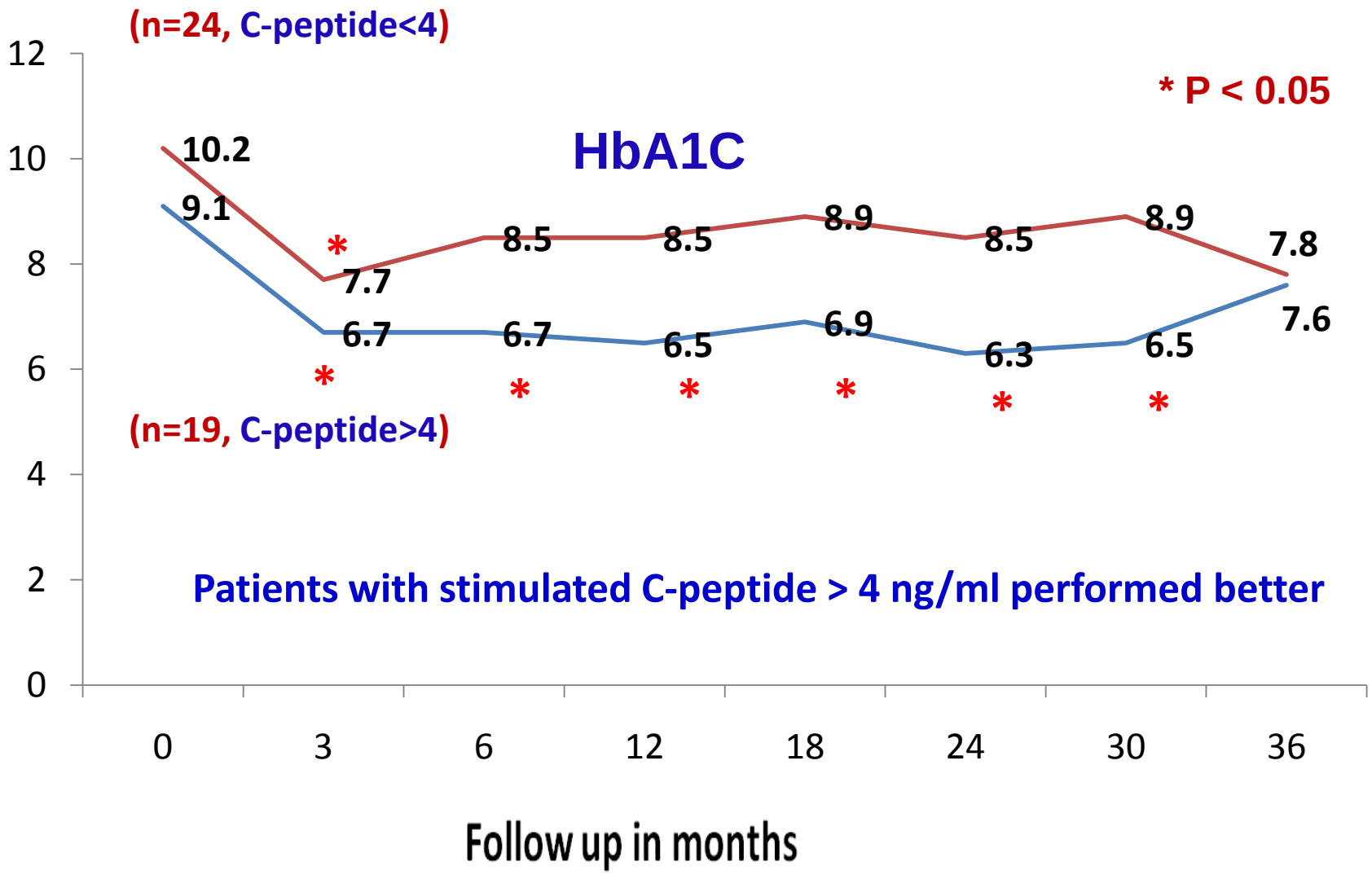
Post operative improvement in HbA1C in obese (BMI > 27) versus non-obese (BMI < 27) patients



Post operative improvement in HbA1C in patients with duration of diabetes ≤ 10 years versus > 10 years



Post operative improvement in HbA1C in patients with stimulated C-peptide < 4 ng/ml versus > 4 ng/ml



Diabetes and Hypertension remission data in patients under different groups

	Patients with remission in Diabetes						Patients with remission in hypertension					
Month	BMI >27 kg/ m^2	BMI< 27 kg/ m^2	DM duration <10 years	DM duration >10 years	Stimulated-pep > 4 ng/ml	Stimulated-pep <4 ng/ml	BMI >27 kg/ m^2	BMI <27 kg/ m^2	DM duration <10 years	DM duration >10 years	Stimulated C-pep >4 ng/ml	Stimulated C-pep <4 ng/ml
3 mth	15/ 29	5/13	16/ 25	4/17	15/24	5/18	20/21 *	5/7 *	14/15 *	11/13 *	18/19 *	7/9 *
6 mth	17/ 29 *	3/13 *	17/2 5*	3/17	16/24 *	4/ 18	13/15 *	3/5 *	10/11 *	6/9 *	11/13 *	5/7 *
12 mth	18/ 26*	4/10	16/ 23*	6/13	17/25 *	5/11	7/8 *	½	7/8 *	½	7/8 *	½
18 mth	11/ 16*	1/6	10/ 15*	2/7	9/14 *	3/8	6/8 *	½	5/7 *	2/3 *	6/8 *	½
24 mth	9/10 *	2/4 *	8/ 10*	3/4 *	9/11 *	2/3	5/5 *	0/1	5/5 *	0/1	5/6 *	0/0
30 mth	3/5	1/3	4/6	0/2	4/5	0/3	5/5*	0/0	4/4*	1/1*	5/5*	0/0
36 mth	2/3	1/2	2/2*	1/3	3/3*	0/2	3/3*	0/0	3/3*	0/0	3/3*	0/0

Complications

- **Nausea & loss of appetite for initial 1 month in about 25% of the patients**

- **Six patients had difficulty in swallowing rapidly, which subsided over 2 weeks**

Published: 3 Original Articles
(1st- 1 year follow up data of 10 patients)

DIA-2009-0070-Kumar_1P
Type: Original Article

Original Article

DIABETES TECHNOLOGY & THERAPEUTICS
Volume 11, Number 12, 2009

DOI: 10.1089/dia.2009.0070

Ileal Interposition with Sleeve Gastrectomy for Control of Type 2 Diabetes

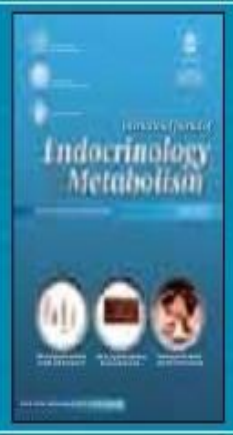
K.V.S. Hari Kumar, M.D.,[1] Surendra Ugale, M.S.,[2] Neeraj Gupta, M.B.B.S.,[2] Vishwas Naik, M.S.,[2] Pawan Kumar, M.D.,[3] P. Bhaskar, M.D.,[3] and K.D. Modi, M.D., D.M.[1]

Diabetes Technology and Therapeutics. 2009; 12: 785-9

2nd Report
(2 year follow up data of 37 patients)

KOWSAR

International Journal of
Endocrinology & Metabolism
Journal home page: www.EndoMetabol.com



Remission of Type 2 Diabetes Mellitus by Ileal Interposition with Sleeve Gastrectomy

Sunil Kumar Kota[1*], Surendra Ugale[2], Neeraj Gupta[2], Vishwas Naik[2],
KVS Hari Kumar[4], Kirtikumar D Modi[1]

International Journal of Endocrinology and Metabolism. 2011; 9: 374-381.

Accepted for publication by Ind J endocrinol Metab

Original Article

Ileal interposition with sleeve gastrectomy for treatment of type 2 diabetes mellitus

Sunil Kumar Kota, Surendra Ugale[1], Neeraj Gupta[1], Vishwas Naik[1], KVS Hari Kumar[2], Kirtikumar D Modi,

Conclusion 1

It has dual mechanism to address insulin secretion & insulin resistance (foregut and the hindgut theories)

Better remission / improvement in DM, HTN & Metabolic parameters in patients with

- Higher BMI (> 27 kg/m^2)
- Shorter duration of diabetes (≤ 10 yrs)
- Higher stimulated C-peptide levels (> 4 ng/ml)

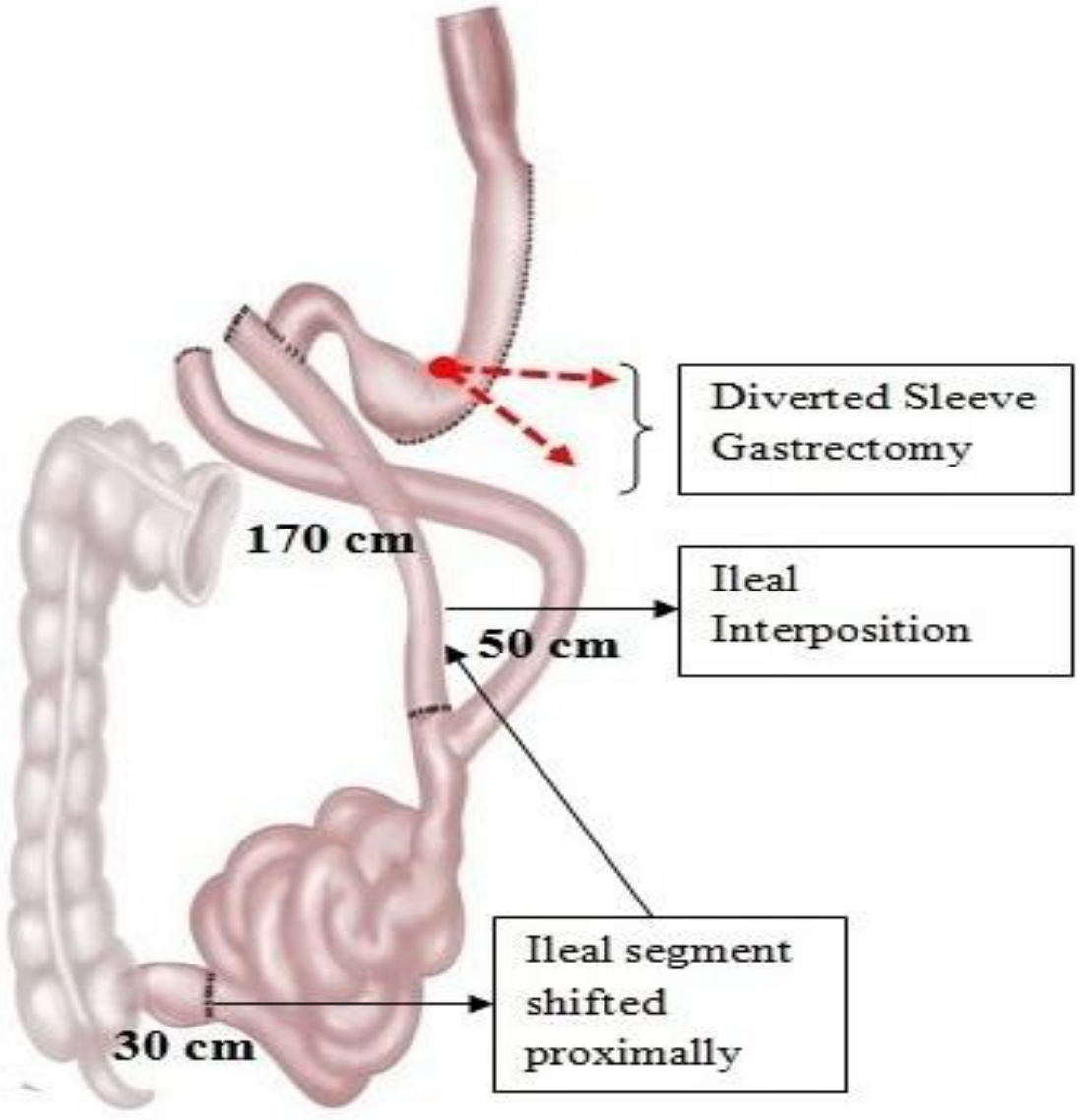
II+ Diverted SG (DSG)

- **Hypothesized to act better in the subgroup of patients with adverse baseline parameters**

  - Exclusion of duodenum eliminating the role of Rubino's factor

  - Ileal segment shifted more proximally leading to earlier and higher GLP-1 secretion

Diverted Sleeve Gastrectomy with Ileal Interposition



Patient Demography

No of patients (n)	17 (M:F=12:5)
Mean age of patients	50.7 ± 8.1 years (range- 34-66yr)
Mean duration of diabetes	15.1 ± 5.8 years
Mean preop fasting C-peptide	2.5± 1.8 ng/ ml
mean preop postprandial C-pep	4.2± 2.2 ng/ml
Mean preop HOMA-IR	17.1 ± 38.1
Mean preop FBS	236.8± 88.4 mg/dl
Mean preop PLBS	305.1± 124.3 mg/dl
Mean preop HbA1C	9.8± 1.8 %

Patient Demography

- Mean preop BMI- 29.2 ± 7.5 kg/m^2

  Number of Patients with

  - BMI < 25 kg/m^2- 13 (72%)
  - BMI > 27 kg/m^2- 5 (28%)

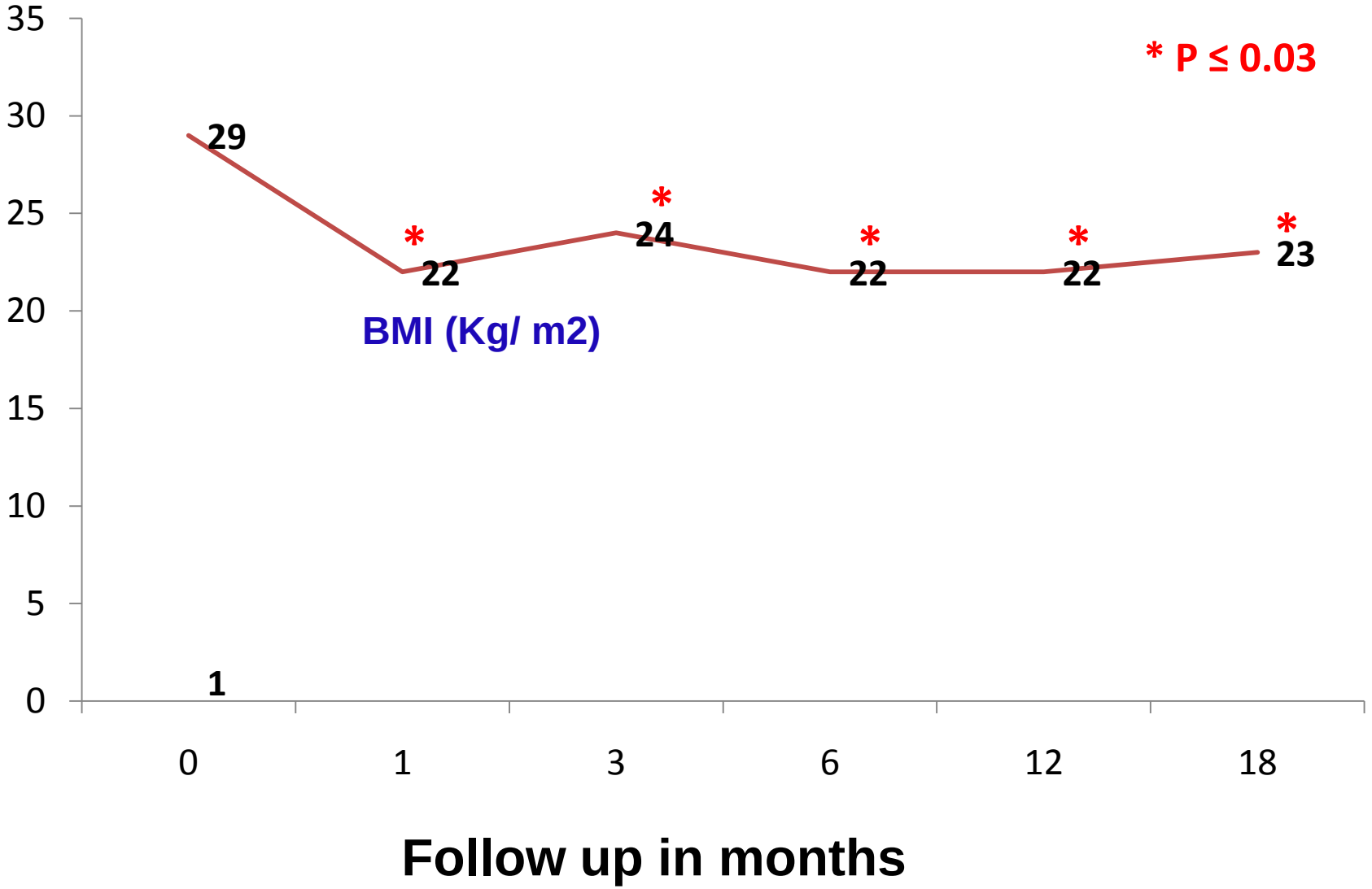
- Number of patients with

  - Hypertension- 8 (45%)
  - Dyslipidemia- 7 (39%)
  - Microalbuminuria- 7 (39%)

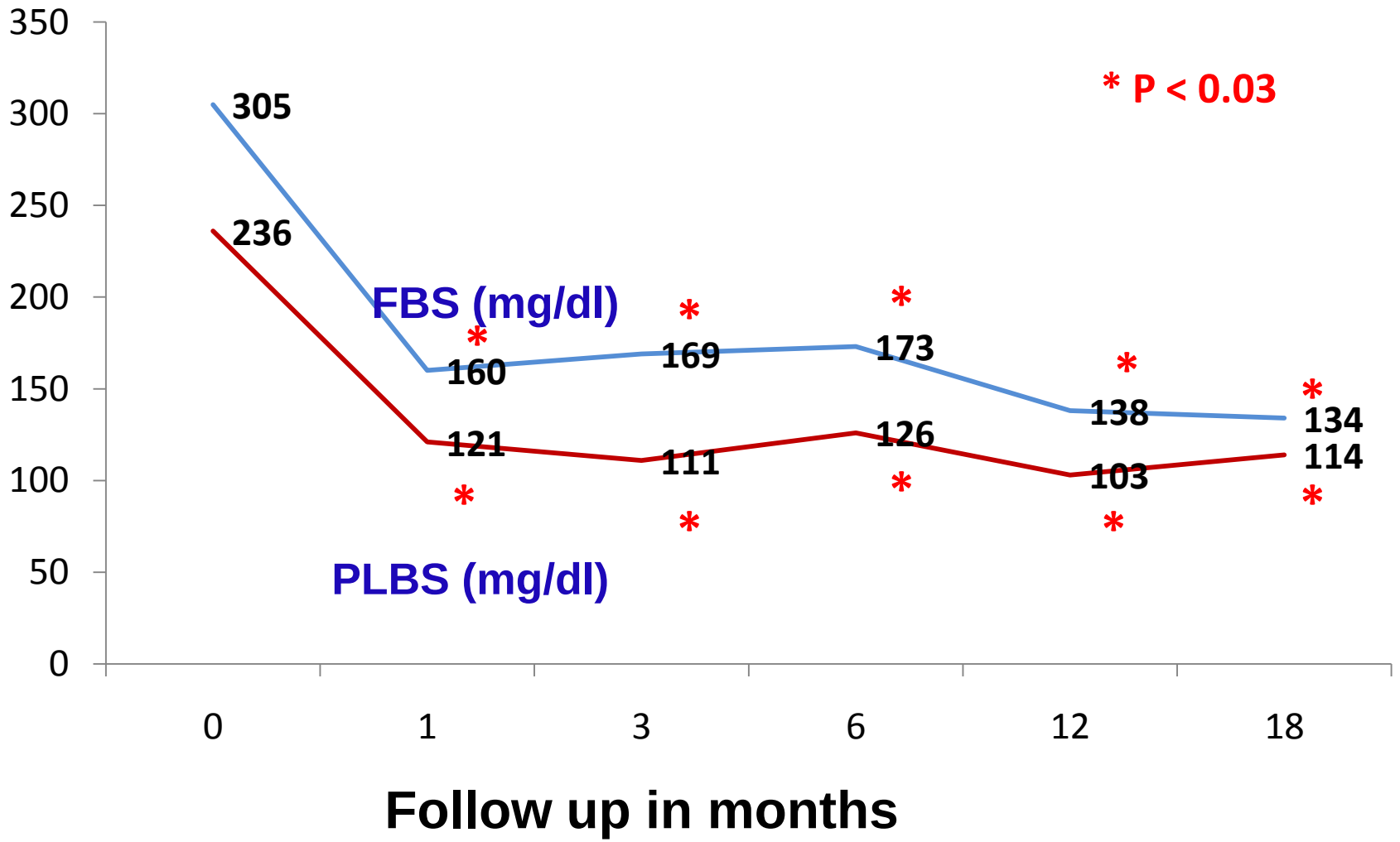
- Number of patients requiring

  - ≥ 2 OHA- 8
  - Insulin ± OHA- 10

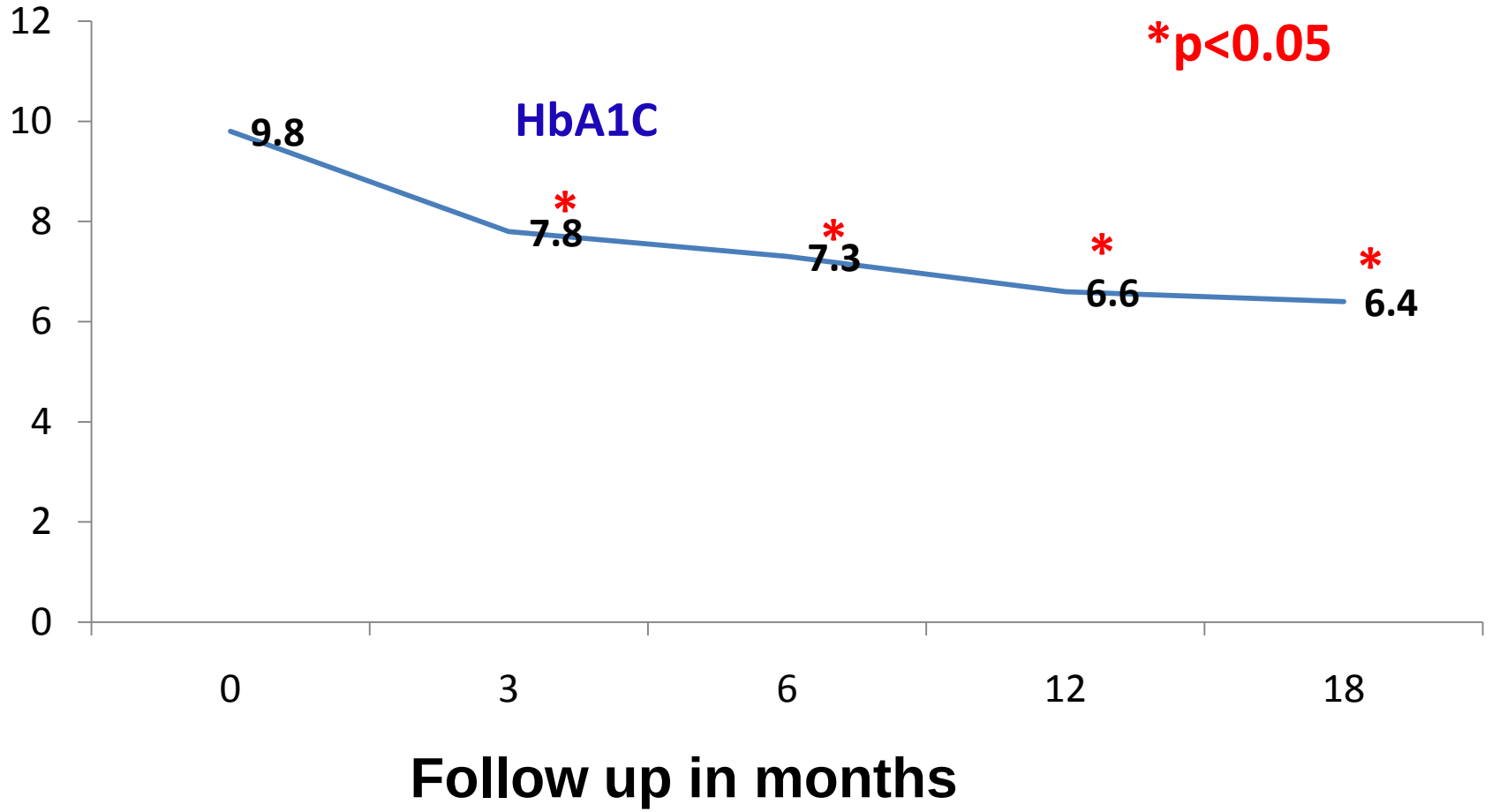
Post operative mean BMI



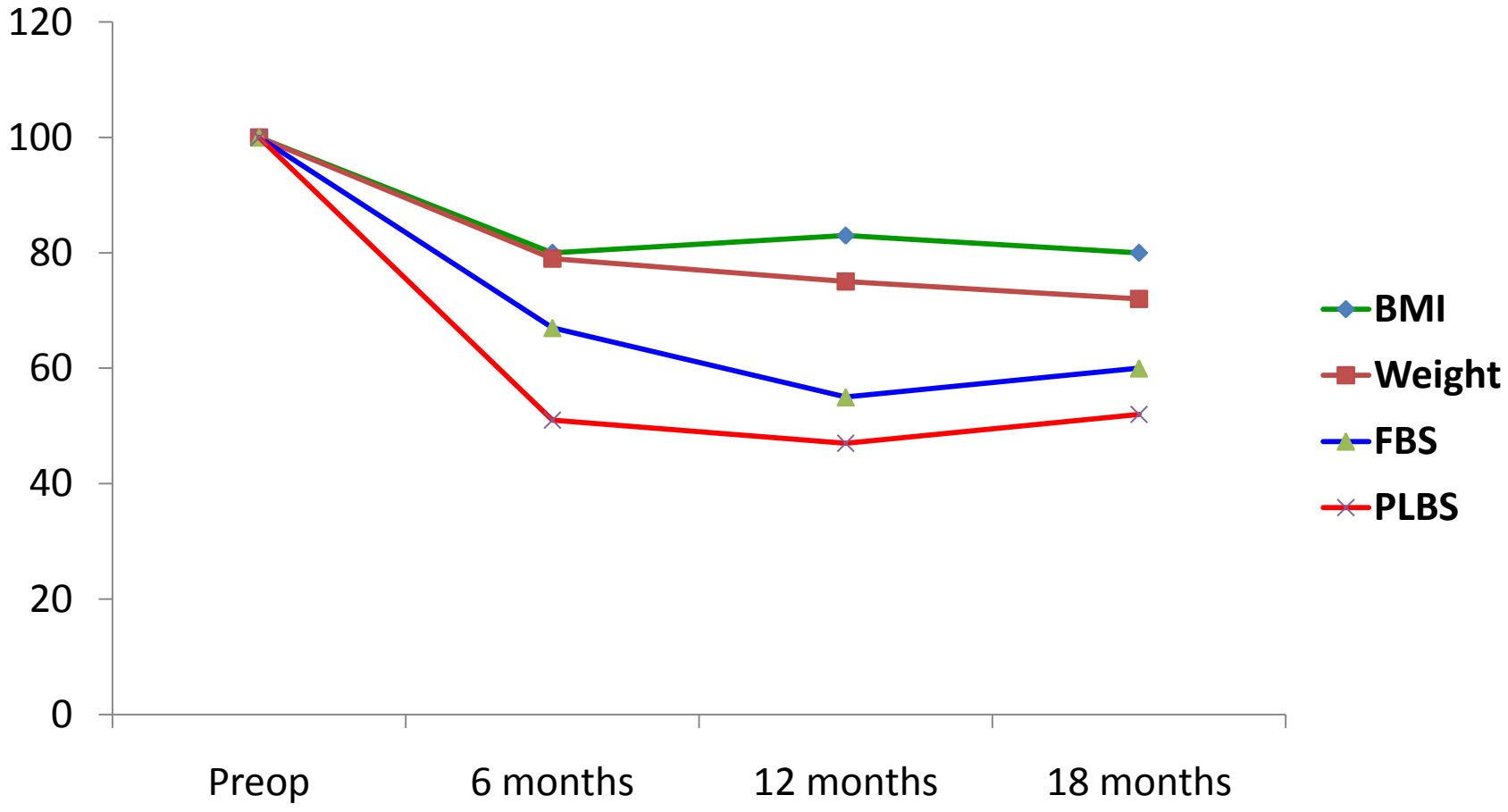
Post operative mean FBS & PLBS



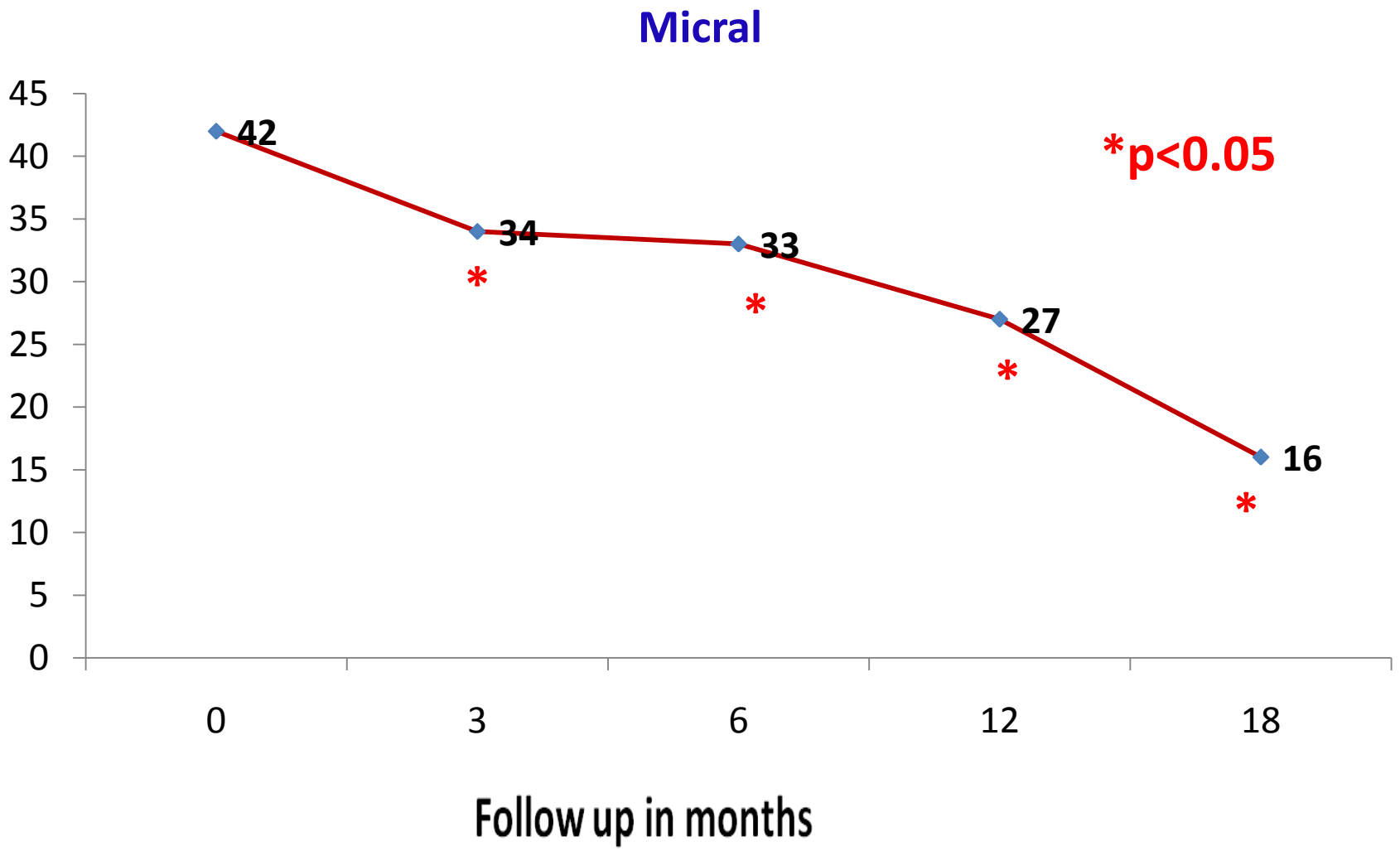
Post operative mean HbA1C



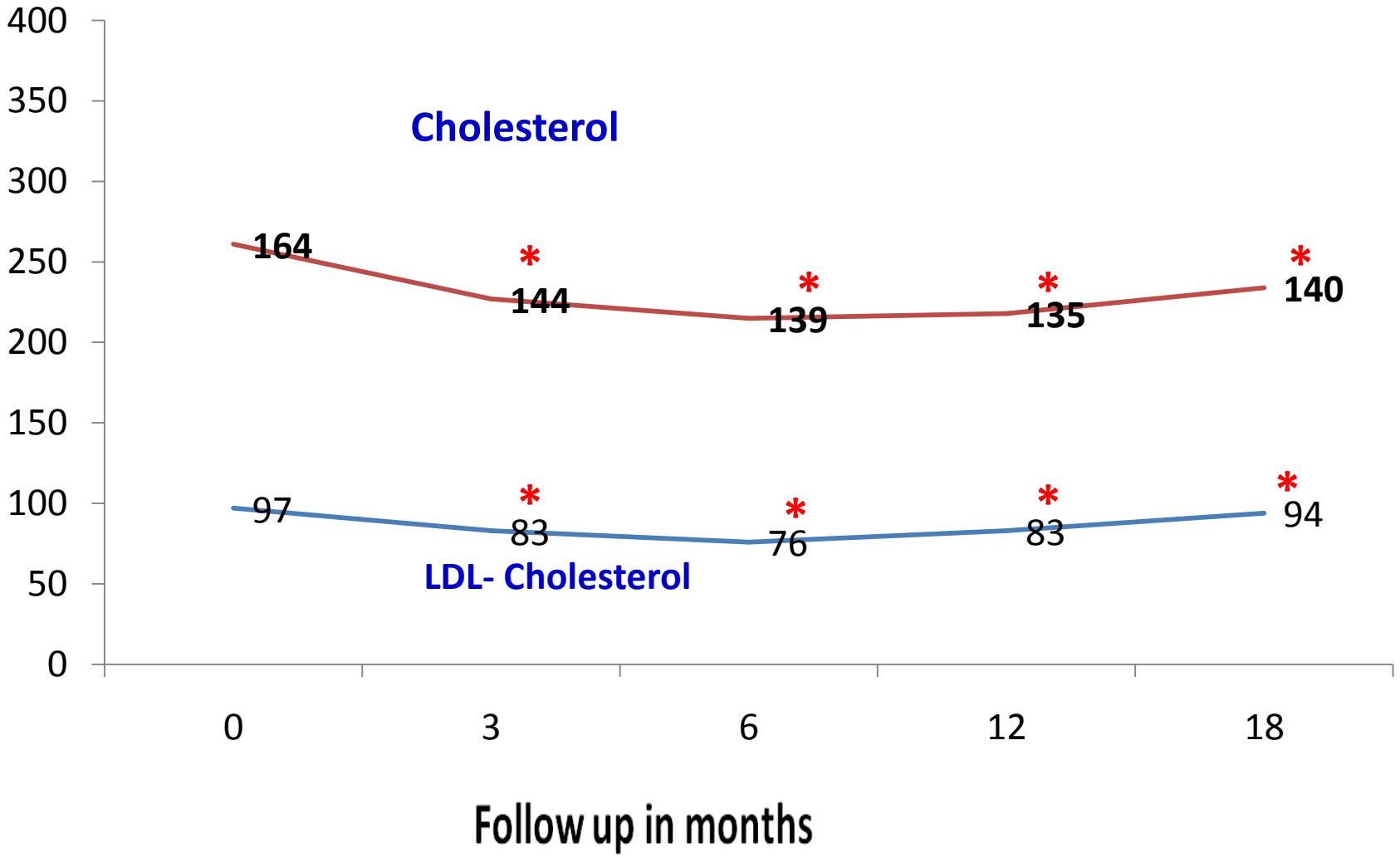
Weight loss independent glycemic improvement (Preop status 100%)



Post operative mean Microalbuminuria



Post operative mean Lipid



Postoperative Complications

- **3 patients had minor intraoperative complications**

  - Passage of C-arm into abdominal wall

  - Duodenal exudation leading to application of drain

  - Antral perforation closed with PDS suture

- **1 patient developed ileus with ileal perforation. At 2 weeks, subjected to laparotomy for repair**

- **3 patients had nausea and anorexia for 2 weeks**

- **2 patients developed vitamin B12 deficiency at 12 months.**

Conclusion …….

- Metabolic surgery is a novel surgical way to address obesity and type 2 diabetes
- It promises high cure rate (45-80% for II+SG and 75% for II+DSG) for diabetes and significant improvement in metabolic parameters
- II+DSG scores better in terms of metabolic improvement

Metabolic surgery-"It is not about living *with diabetes; it is* about living *without it*."

Thank You

www.medwinendocare.com

www.diabetessurgeryindia.com