

# High blood pressure after weight loss surgery

<b>Submission date</b> 30/05/2022	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
<b>Registration date</b> 13/06/2022	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 23/05/2023	<b>Condition category</b> Circulatory System	<input type="checkbox"/> Individual participant data

## Plain English Summary

### Background and study aims

Weight loss (bariatric) surgery helps patients quickly and permanently lose weight and recover from other diseases that coexist with obesity, such as high blood pressure (hypertension). The reduction of the size of the stomach (sleeve gastrectomy) and bypassing part of the stomach (one-anastomosis gastric bypass), so food cannot be absorbed, are currently among the most common surgical procedures for overweight patients to achieve significant weight loss. Previous studies have shown that various bariatric surgeries can improve hypertension. Even though bariatric surgery significantly improves or cures hypertension, new studies have documented the return of hypertension after these procedures. To our knowledge, no study has evaluated the return of hypertension between sleeve gastrectomy and one-anastomosis gastric bypass. We examined the number of patients who were previously cured of their hypertension (remission) and then relapsed and assessed the risk factors in hypertensive patients having those surgeries throughout a three-year follow-up period.

### Who can participate?

Obese adults with high blood pressure who have had weight loss surgery

### What does the study involve?

Obese patients with high blood pressure who had weight loss surgery are followed over time to see if their high blood pressure gets better or returns

### What are the possible benefits and risks of participating?

Due to the current study results, a better decision can be made in choosing the type of weight loss surgery for patients with hypertension. Also, according to the patient's condition, controllable factors of hypertension relapse can be identified, and action can be taken to prevent it

### Where is the study run from?

Tehran Obesity Treatment Center

### When is the study starting and how long is it expected to run for?

January 2013 to March 2022

Who is funding the study?  
Research Institute for Endocrine Sciences (Iran)

Who is the main contact?  
Dr Amir Ebadinejad  
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## Contact information

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Scientific

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## Additional identifiers

**EudraCT/CTIS number**  
Nil known

**IRAS number**

**ClinicalTrials.gov number**

Nil known

**Secondary identifying numbers**

Nil known

## Study information

**Scientific Title**

Comparison of hypertension remission and relapse after sleeve gastrectomy and one-anastomosis gastric bypass

**Study hypothesis**

The rate of remission and relapse of hypertension varies between sleeve gastrectomy and one-anastomosis gastric bypass

**Ethics approval required**

Old ethics approval format

**Ethics approval(s)**

Approved 07/12/2021, Research Ethics Committee of the Research Institute for Endocrine Sciences of Shahid Beheshti University of Medical Sciences (Yaman Street, Velenjak, Tehran, 1985717434, Iran; +98 22439951; mpd@sbmu.ac.ir), ref. IR.SBMU.ENDOCRINE.REC.1400.096.

**Study design**

Observational prospective cohort study

**Primary study design**

Observational

**Secondary study design**

Cohort study

**Study setting(s)**

Hospital

**Study type(s)**

Treatment

**Participant information sheet**

Not available in web format, please use contact details to request a participant information sheet

**Condition**

Hypertension

**Interventions**

A prospective cohort study with a follow-up of three years was conducted on severely obese patients between 2013 and 2018 in the context of Tehran Obesity Treatment Study who

underwent sleeve gastrectomy or one-anastomosis gastric bypass. Hypertension (HTN) remission was defined as the normalization of blood pressure (BP) with the discontinuation of medical treatment, and HTN relapse was defined as the need for the onset of antihypertensive drugs or the occurrence of BP impairment.

## **Intervention Type**

Procedure/Surgery

### **Primary outcome measure**

1. Hypertension (HTN) remission, as defined in established guidelines, measured using a mercury sphygmomanometer twice on the left arm for a minimum of 30 seconds while the patient was seated on a chair and using the Korotkoff sound technique at pre-surgery, 3-, 6-, 12-, 18-, 24-, and 36-months post-surgery.

HTN was defined as systolic blood pressure (SBP) equal to or above 140 mm Hg or diastolic blood pressure (DBP) equal to or above 90 mm Hg. In patients with preoperative HTN, remission was identified on the day on which the patient met all of the following three criteria:

- 1.1. SBP <140 mm Hg
- 1.2. DBP <90 mm Hg
- 1.3. Discontinuation of antihypertensive drugs

2. HTN relapse, which due to the lack of a clear definition was defined as the deterioration of HTN remission, measured using a mercury sphygmomanometer twice on the left arm for a minimum of 30 seconds while the patient was seated on a chair and using the Korotkoff sound technique at pre-surgery, 3-, 6-, 12-, 18-, 24-, and 36-months post-surgery.

Relapse in the patients who experienced remission after bariatric surgery was defined as follows:

- 2.1. The need for prescribing any antihypertensive drug regardless of BP
- 2.2. SBP  $\geq$  140 mm Hg or DBP  $\geq$  90 mm Hg

3. Biochemical parameters in blood samples collected between 7 and 9 am after 12 to 14 hours of overnight fasting were measured on the same day:

- 3.1. Fasting plasma glucose, as measured using the enzymatic colorimetric method at pre-surgery, 3-, 6-, 12-, 18-, 24-, and 36-months post-surgery
- 3.2. Serum triglyceride, as measured using the enzymatic colorimetric method at pre-surgery, 3-, 6-, 12-, 18-, 24-, and 36-months post-surgery
- 3.3. Total cholesterol, as measured using the enzymatic colorimetric method at pre-surgery, 3-, 6-, 12-, 18-, 24-, and 36-months post-surgery
- 3.4. High-density lipoprotein-cholesterol, as measured after precipitation of apolipoprotein B-containing lipoproteins with phosphotungstic acid at pre-surgery, 3-, 6-, 12-, 18-, 24-, and 36-months post-surgery
- 3.5. Low-density lipoprotein-cholesterol, as measured using serum total cholesterol, triglyceride, and high-density lipoprotein-cholesterol concentrations at pre-surgery, 3-, 6-, 12-, 18-, 24-, and 36-months post-surgery. (Friedewald formula: LDL cholesterol = total cholesterol - HDL - (triglycerides / 5))
- 3.6. Hemoglobin A1C, as measured using affinity chromatographic method at pre-surgery, 3-, 6-, 12-, 18-, 24-, and 36-months post-surgery

### **Secondary outcome measures**

The relationship between remission and relapse of HTN was measured using a Cox regression analysis of risk factors such as:

1. Smoking measured using a questionnaire (never, past, current smoker) at baseline
2. Diabetes as defined as fasting plasma glucose  $\geq$  126 mg/dl or hemoglobin A1C  $\geq$  6.5 or current

medication therapy for a definite diagnosis of diabetes at baseline

3. Lack of appropriate weight loss after surgery measured using EWL < 70% at one year after surgery (EWL% = [Initial weight - Postop weight] / [Initial weight - Ideal weight] \* 100)

4. Old age measured using a questionnaire (more than 45 years) at baseline

5. High consumption of antihypertensive drugs was measured using a questionnaire (more than two antihypertensive drugs) at baseline

**Overall study start date**

01/01/2013

**Overall study end date**

28/03/2022

## Eligibility

**Participant inclusion criteria**

1. Enrollment in the TOTS study with a body mass index >35
2. Participants aged 18 years and over
3. Preoperative hypertension
4. Bariatric surgery consisting of sleeve gastrectomy or one-anastomosis gastric bypass

**Participant type(s)**

Patient

**Age group**

Adult

**Lower age limit**

18 Years

**Sex**

Both

**Target number of participants**

4320

**Total final enrolment**

787

**Participant exclusion criteria**

1. Secondary hypertension (secondary to renal sclerosis, primary hyperaldosteronism, conns syndrome, renovascular problems)
2. Chronic kidney disease with eGFR < 60
3. Current Cancer
4. Revisional bariatric surgery

**Recruitment start date**

31/03/2013

**Recruitment end date**

31/05/2018

## Locations

### Countries of recruitment

Iran

### Study participating centre

#### Tehran Obesity Treatment Center

Tehran

Iran

1985717413

### Study participating centre

#### Mostafa Khomeini Hospital

9, Italy St Palestine St

Keshavarz Boulevard

Valiasr Square

Tehran

Iran

1416643491

### Study participating centre

#### Day General Hospital

Abbas Pour St

Vali-e-Asr St

Tehran

Iran

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### Study participating centre

#### Khatam-Al-Anbya Hospital

Rashid Yasemi Street

Upper than Mirdamad St

Vali- Asr St

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Tehran

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## Sponsor information

**Organisation**

Research Institute for Endocrine Sciences

**Sponsor details**

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**Sponsor type**

Research organisation

**Website**

<https://endocrine.ac.ir/>

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<https://ror.org/01kpm1136>

**Funder(s)****Funder type**

University/education

**Funder Name**

Research Institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences

**Alternative Name(s)**

Research Institute for Endocrine Sciences, RIES

**Funding Body Type**

Private sector organisation

**Funding Body Subtype**

Universities (academic only)

**Location**

Iran

# Results and Publications

## Publication and dissemination plan

Planned publication in a high-impact peer-reviewed journal

## Intention to publish date

30/11/2022

## Individual participant data (IPD) sharing plan

The datasets used and analyzed in the current study are available from the corresponding author Dr Maryam Barzin [m.barzin7@gmail.com](mailto:m.barzin7@gmail.com) on reasonable request.

## IPD sharing plan summary

Available on request

## Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>	results	20/01/2023	23/05/2023	Yes	No