



Management of hypertension in obesity

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Road map

- Current obesity narrative
- I have a case
- Case review questions
- Patient perspective
- How to diagnose hypertension
- How to devise a management scheme
- Clinical pearls

Criteria for EASO-Collaborating Centres for Obesity Management

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Task Force of the European Association for the Study of Obesity



Obesity specialists come out of multiple disciplines

EASO Certification in Obesity Management



The EASO Certification in Obesity Management recognises national and European experts in obesity management.

Applicants must be a fully paid up member of their affiliated EASO National Association (where an affiliated Association exists in the applicant's country of residence). Each applicant should obtain a written endorsement from their National Association, or in special circumstances where no affiliated National Obesity Association exists, directly from EASO. Each application is reviewed by the EASO OMTF (Obesity Management Task Force) or EASO COTF (Childhood Obesity Task Force) as appropriate. Successful applicants will be notified by the EASO Secretariat. Nominations will be reported at each ECO, via the EASO website, in Obesity Facts and via EASO membership newsletters.



National Clinical Fellow

To qualify as an EASO National Clinical Fellow, an applicant must hold a role in an accredited EASO COM and/or complete the EASO endorsed AOMP e-learning programme. EASO will also accept candidates who have completed SCOPE or ABOM training. They must then meet the following criteria:

- ✓ **Be a certified physician or HCP**
- ✓ **Have undertaken training in a medical specialty** relevant to obesity management (E.G. Diabetes; Dietetics; Endocrinology; Gastroenterology; Health/Clinical Psychology Internal Medicine; Paediatrics; Physiotherapy; Primary Care; Surgery).
- ✓ **Clinical experience in obesity management** (not less than 5 years)
- ✓ **Continuing interest and updating in obesity management as shown by participation in international scientific meetings** (3 congress participations with accepted abstracts or invited presentations in the last 5 years, notably ECO).

European Clinical Fellow

To qualify as an EASO European Clinical Fellow, an applicant must hold a **management role** in an accredited EASO COM and meet the following criteria:

- ✓ **Be a certified physician or HCP**
- ✓ **Have undertaken training in a medical specialty** relevant to obesity management (E.G. Diabetes; Dietetics; Endocrinology; Gastroenterology; Health/Clinical Psychology Internal Medicine; Paediatrics; Physiotherapy; Primary Care; Surgery).
- ✓ **Clinical experience in obesity management** (not less than 10 years) with particular reference to referral of patients who are difficult to treat.
- ✓ **High-level engagement in scientific activities**, including participation and presentation at internationally renowned and recognized courses and congresses (3 presentations in last 5 years).
- ✓ **At least 10 international, peer-reviewed publications on obesity or obesity-related diseases**, preferably published over the last 5 years, or 20 publications with no time limit.

A person with uncontrolled blood pressure seeking treatment

- Mr. Smith is a 43-year-old man who is going to see his doctor to discuss how he can put his blood pressure under control. He says he is healthy except for high blood pressure he has for the last two years
- He does not have a history of coronary artery disease or diabetes. Has night eating, CHO cravings and possible hypoglycemia after heavy meals
- He currently does not take any medications or non-prescription supplements. He does not smoke nor drink alcohol
- Both of his parents have type 2 diabetes
- He says he might have a weight problem but he can manage it himself. He has never sought professional support of any kind so far for high blood pressure or obesity
- He always feels hungry, orders take-out meals most of the time, has his own business working from home office. He is a member of a fitness club but visits the place infrequently.

Physical exam

Vital signs are unremarkable. Weight 101kg, height 167cm, Body Mass Index (BMI) is 36.2. His waist circumference is 102 cm. BP: 170/110 mmHg, pulse 88/min NSR. No stigmata for Cushing's Syndrome. There is acanthosis nigricans on the neck and arm pits. No facial or pretibial edema. The rest of the examination is unremarkable.

Laboratory results

FBG	110mg/dl	Creatinine	0.8mg/dl	Ferritin	55ng/ml	TSH	1.5μIU/ml
OGTT	177mg/dl	Na	140mmol/L	Vit B12	496pg/ml	Albuminuria	5 mg/g
HbA1c	%5.9	K	4.1mmol/L	Leucocyte	8,700/μL	Abdominal US	MAFLD
HOMA-IR	3.5	Uric acid	5.0mg/dl	Platelet	310,000/μL		
Total Cholesterol	210mg/dl	ALT	76U/L	Ca	9.2mg/dl		
Triglyceride	150mg/dl	AST	32	P	3.9mg/dl		
HDL-Cholesterol	30mg/dl	CPK	130U/L	Albumin	4.0g/dl		
LDL-Cholesterol	150mg/dl	Hb	14.3g/dl	25OH VitD	42ng/ml		

Case review questions

1. What are your diagnoses?
2. What is your treatment plan for hypertension?
3. What is your treatment plan for obesity?
4. Is Mr. Smith a candidate for an antiobesity drug?
5. Is Mr. Smith a candidate for bariatric surgery?
6. What is your follow-up plan?

Diagnoses

1. Obesity
2. Hypertension
3. Pre-diabetes
4. Insulin resistance
5. MAFLD

Classification of office blood pressure

Category	Systolic (mmHg)		Diastolic (mmHg)
Optimal	<120	and	<80
Normal	120–129	and/or	80–84
High normal	130–139	and/or	85–89
Grade 1 hypertension	140–159	and/or	90–99
Grade 2 hypertension	160–179	and/or	100–109
Grade 3 hypertension	≥180	and/or	≥110
Isolated systolic hypertension ^b	≥140	and	<90

Joint statement of the European Association for the Study of Obesity and the European Society of Hypertension: obesity and difficult to treat arterial hypertension

Jens Jordan^a, Volkan Yumuk^b, Markus Schlaich^c, Peter M. Nilsson^d, Barbara Zahorska-Markiewicz^e, Guido Grassi^{f,g}, Roland E. Schmieder^h, Stefan Engeli^a, and Nick Finerⁱ
Journal of Hypertension 2012, 30:1047-1055.

- Patients with obesity are prone to arterial hypertension require more antihypertensive medications, and have an increased risk of treatment-resistant arterial hypertension
- Overactive sympathetic nervous system, overstimulation of RAAS, adipokines, insulin resistance, structural and functional renal changes appear to be involved
- Renin-angiotensin system inhibitors are considered to be the first line drugs
- Most hypertensive patients with obesity require two or more antihypertensive drugs
- Finally, how to combine weight loss strategies and antihypertensive treatment to achieve an optimal clinical outcome is unresolved

Treatment & follow-up

LIFESTYLE MODIFICATIONS

MODIFICATION	Approximate SBP reduction (range)
Weight reduction	5-20 mmHg/10 kg weight loss
Healthy diet	2-8 mmHg
Dietary sodium restriction	8-14 mmHg
Physical activity	4-9 mmHg
Moderate alcohol consumption	2-4 mmHg

1. Hypertension management
 - Lifestyle intervention
 - ARB or ACEI plus CCB or
 - ARB/ACEI plus thiazide
2. Obesity management
 - Lifestyle intervention
 - Anti-obesity medication
3. Preobesity+IR
 - Biguanide

Dietary recommendations

Assessment:

- 24-hour food consumption record

Goal setting

- Nutritional goals have been determined according to body weight, blood glucose, lipids, and blood pressure

Nutrition intervention/ Self management training

- A medical nutrition therapy was planned to fulfill the individual energy/macronutrient requirements
- Sugar added food or beverage intake, saturated fat consumption and salt intake were restricted
- Glycemic index and glycemic load explained
- High fat take-out food consumption not recommended

Exercise prescription

Pre-exercise risk analysis

Age, sedantary lifestyle, obesity, hypertension, blood glucose and lipids

Exercise stress test, $\text{VO}_{2\text{ max}}$

Barriers:

No swimming or bicycling experience

Suggestions:

Aerobic exercise:

Type: Brisk walking

Frequency: 4 days/wk

Duration: 20-30 mins

Intensity: 40-50% of max heart rate

Anaerobic exercise:

Elastic band streching, 3-4 days/wk

Low/intermediate resistance

10 repeats

Preparing the patient for a change-1

- No one is to be judged by body size or physical appearance
- Every patient has a story to tell and it is very unique & special
- If your patient is avoiding to talk about weight you give it a start by asking permission to do so. If still not wanting ask what does he/she wants to talk about?
- Family history is very important. Family members, who is he/she living with, how would relationships be described, emotions environment life conditions
- What does food mean to any of the family members. Are you dining together or alone? What is your meal plan? Who does the shopping?
- What made you decide to seek professional help?

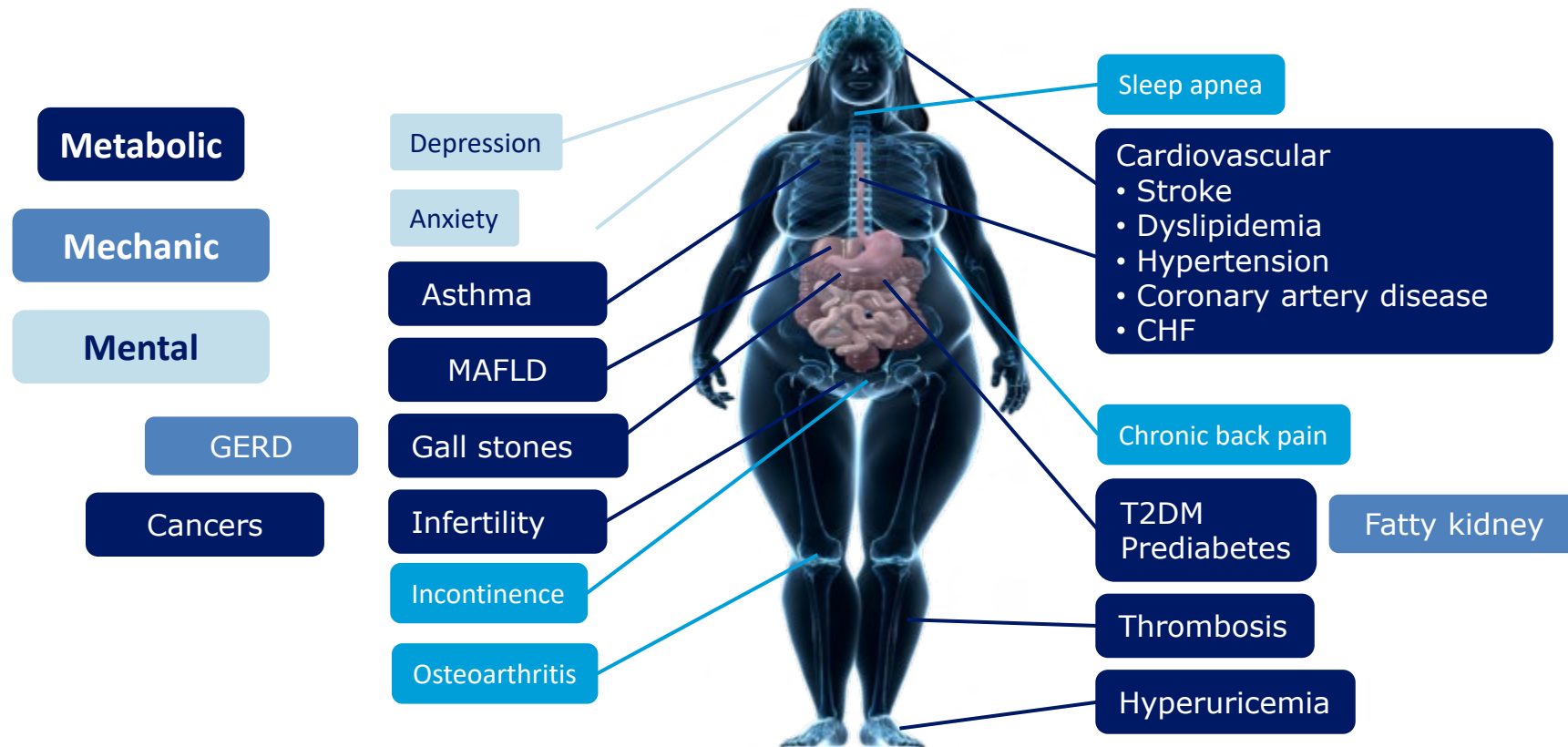
Preparing the patient for a change-1

- Other people's judgement and comments regarding my weight and eating habits make me want food more and therefore I exaggerate
- I want to think about food while I am hungry. Not all the time
- Obesity is fed by my fear of gaining weight
- What does physical activity and exercise imply?
- Who listens to you and understands you the most?
- Who are aware of whatever you are going through?
- Why did it take so long to reach a health professional?

Patient perspective

- None of the HCPs I have consulted until now brought up obesity and discussed weight loss
- The drug I am using for obesity shut down my appetite and halted my night eating
- My headaches vanished after my BP was put under control with treatment
- I did not know weight loss could also help my BP go down
- Metformin stopped my cravings for sugars

Complications of obesity



Causes & characteristics of hypertension

Characteristics of patients with resistant hypertension	Causes of secondary resistant hypertension	Drugs and substances that may cause raised BP
Demographics • Older age (especially >75 years) • Obesity • More common in black people • Excess dietary sodium intake • High baseline BP and chronicity of uncontrolled hypertension	More common causes • Primary hyperaldosteronism • Atherosclerotic renovascular disease • Sleep apnoea • CKD	Prescribed drugs • Oral contraceptives • Sympathomimetic agents (e.g. decongestants in proprietary cold remedies) • Non-steroidal anti-inflammatory drugs • Cyclosporin • Erythropoietin • Steroids (e.g. prednisolone and hydrocortisone) • Some cancer therapies
Concomitant disease • HMOD: LVH and/or CKD • Diabetes • Atherosclerotic vascular disease • Aortic stiffening and isolated systolic hypertension	Uncommon causes • Pheochromocytoma • Fibromuscular dysplasia • Aortic coarctation • Cushing's disease • Hyperparathyroidism	Non-prescription drugs • Recreational drugs (e.g. cocaine, amphetamines, and anabolic steroids) • Excessive liquorice ingestion • Herbal remedies (e.g. ephedra and ma huang)

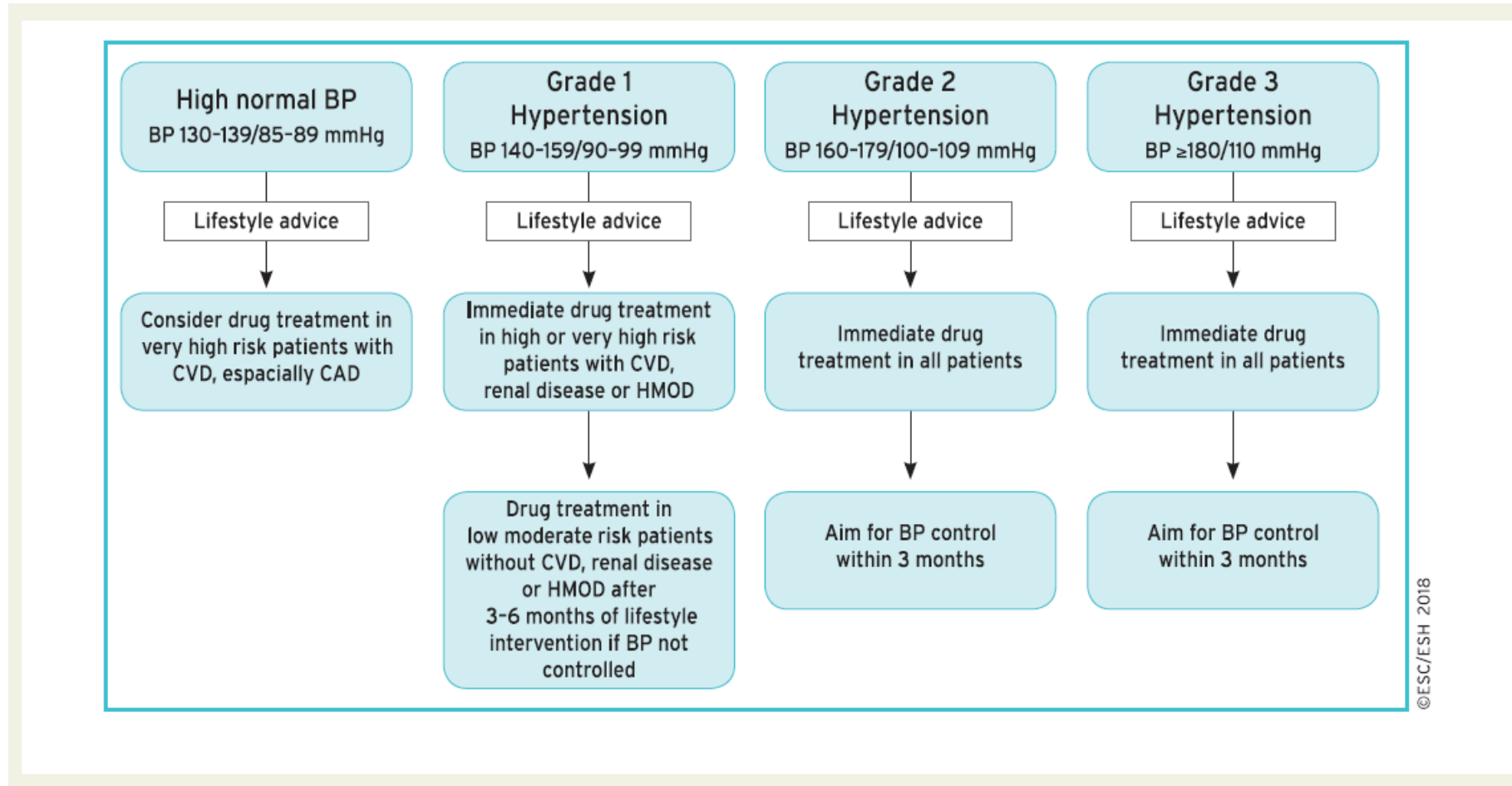
Hypertension disease staging according to risk factors

Social deprivation, the origin of many causes of CVD
Obesity (measured by BMI) and central obesity (measured by waist circumference)
Physical inactivity
Psychosocial stress, including vital exhaustion
Family history of premature CVD (occurring at age <55 years in men and <60 years in women)
Autoimmune and other inflammatory disorders
Major psychiatric disorders
Treatment for infection with human immunodeficiency virus
Atrial fibrillation
LV hypertrophy
CKD
Obstructive sleep apnoea syndrome

Hypertension disease staging	Other risk factors, HMOD, or disease	BP (mmHg) grading			
		High normal SBP 130-139 DBP 85-89	Grade 1 SBP 140-159 DBP 90-99	Grade 2 SBP 160-179 DBP 100-109	Grade 3 SBP ≥180 or DBP ≥110
Stage 1 (uncomplicated)	No other risk factors	Low risk	Low risk	Moderate risk	High risk
	1 or 2 risk factors	Low risk	Moderate risk	Moderate to high risk	High risk
	≥3 risk factors	Low to Moderate risk	Moderate to high risk	High Risk	High risk
Stage 2 (asymptomatic disease)	HMOD, CKD grade 3, or diabetes mellitus without organ damage	Moderate to high risk	High risk	High risk	High to very high risk
Stage 3 (established disease)	Established CVD, CKD grade ≥4, or diabetes mellitus with organ damage	Very high risk	Very high risk	Very high risk	Very high risk

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Initiation of blood pressure lowering treatment



Lifestyle interventions in treating hypertension

Salt restriction to <5 g per day is recommended.

It is recommended to restrict alcohol consumption to <14 units per week for men and <8 units per week for women.

Increased consumption of vegetables, fresh fruits, fish, nuts, unsaturated fatty acids (olive oil); low consumption of red meat; and consumption of low-fat dairy products are recommended.

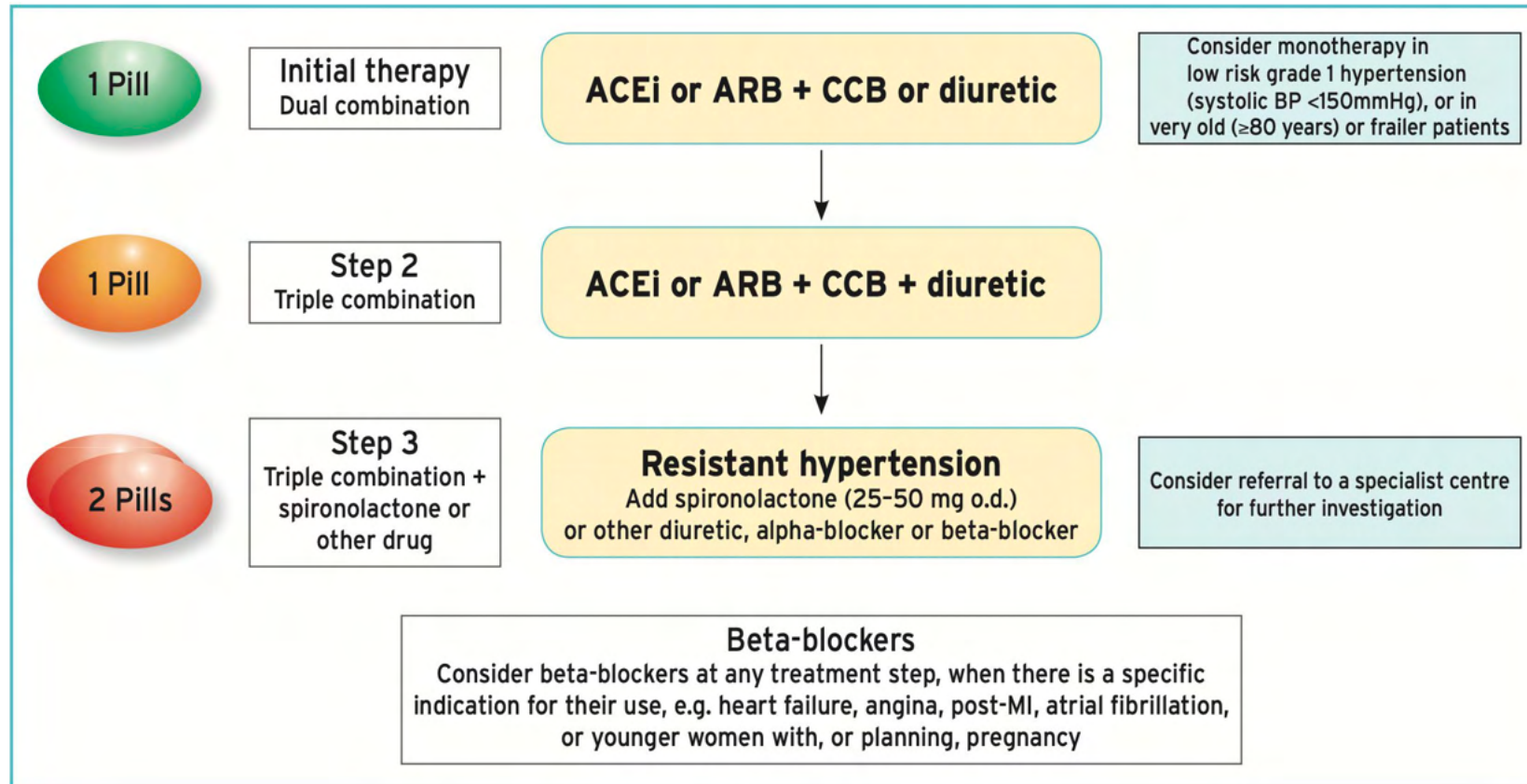
Body weight control is indicated to avoid obesity (BMI >30 kg/m², or waist circumference >102 cm in men and >88 cm in women) and aim for healthy BMI (about 20–25 kg/m²) and waist circumference values (<94 cm in men and <80 cm in women) to reduce BP and CV risk.

Regular aerobic exercise (e.g. ≥ 30 min of moderate dynamic exercise on 5–7 days per week) is recommended.

Smoking cessation and supportive care and referral to smoking cessation programmes are recommended.

It is recommended to avoid binge drinking.

Drug treatment strategy for hypertension

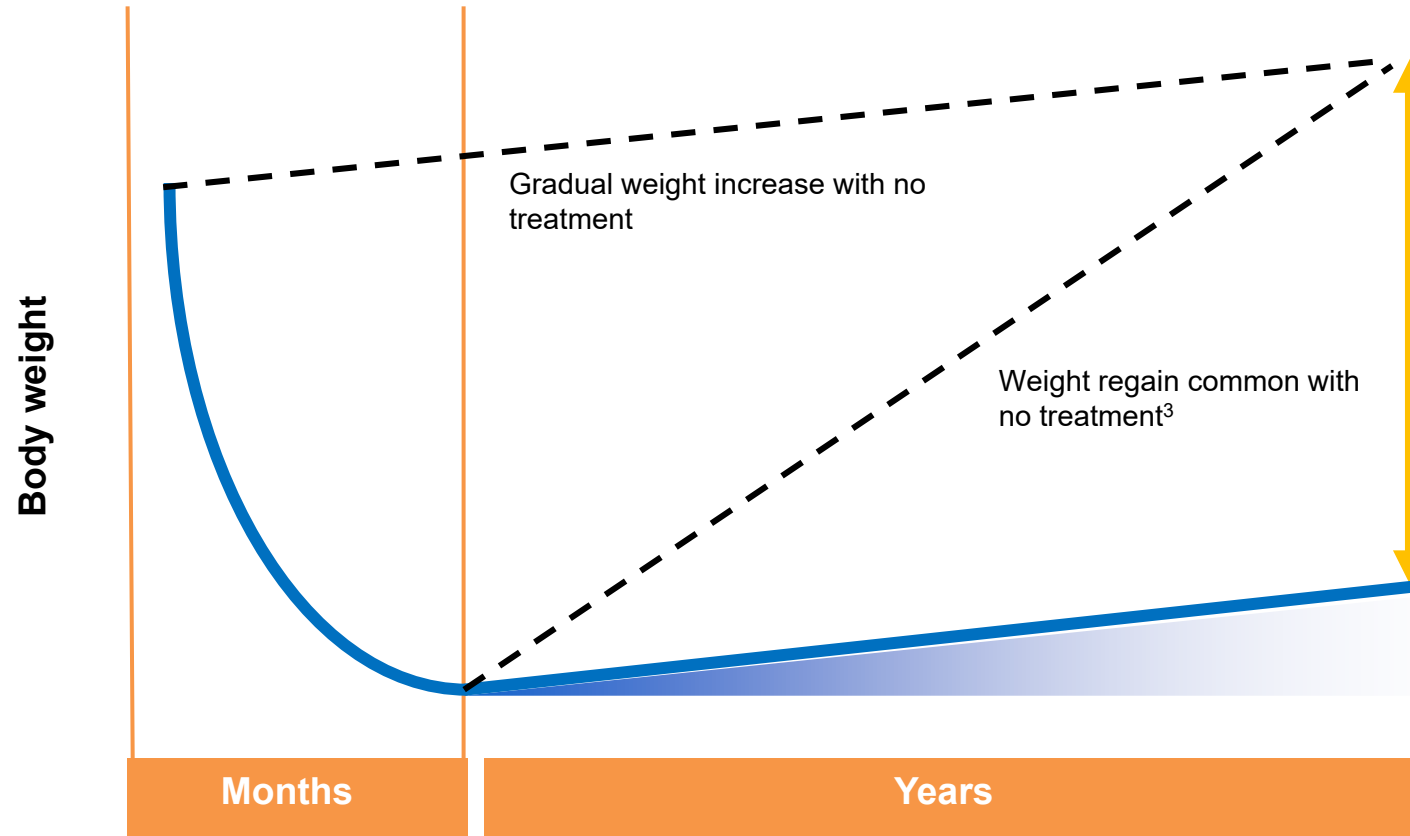


Goals and benefits of effective obesity management

1. Achieve weight loss^{1,2}

2. Maintain weight loss and prevent regain^{1,2}

3. Provide clinically meaningful benefits¹



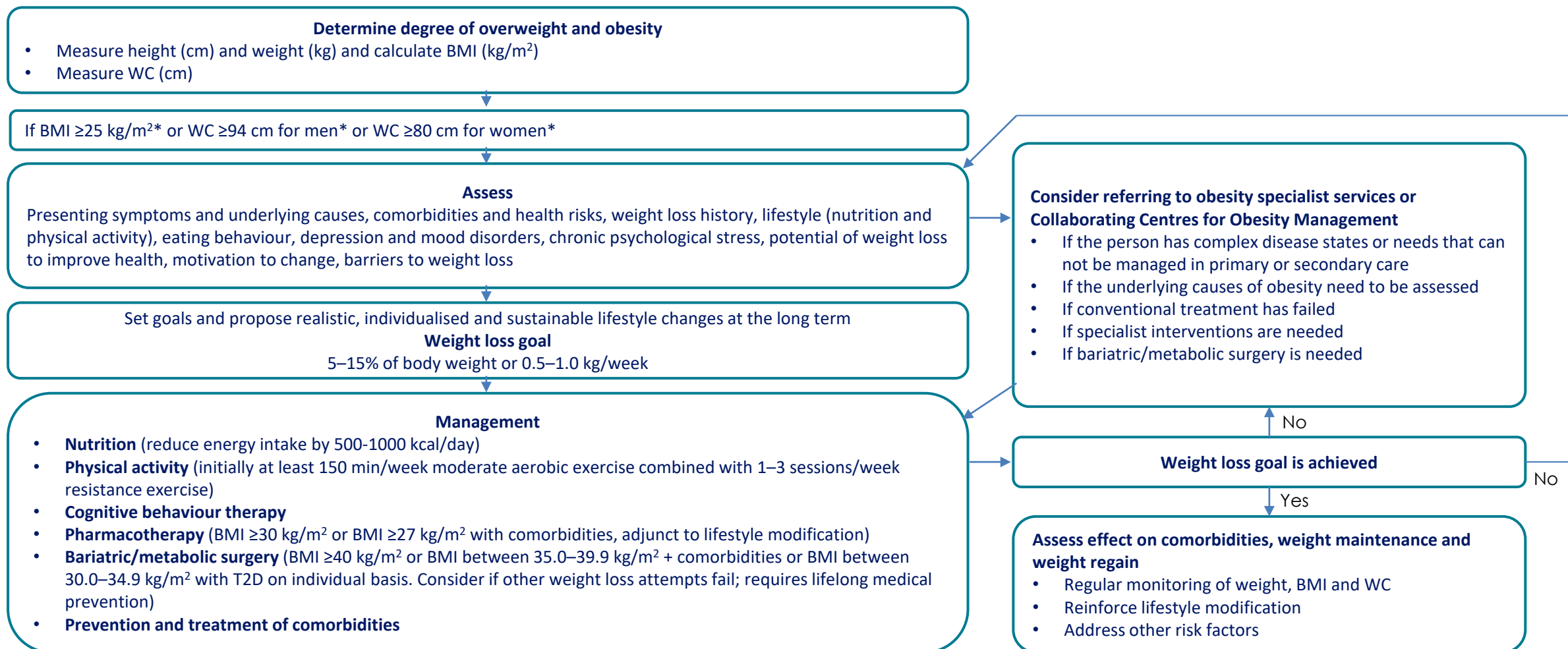
5-15% in 6-12 months

- Reduce diabetes risk¹
- Improve markers of cardiovascular risk¹
- Reduce functional impairment⁴
- Improve quality of life⁴

1. Wadden et al. *Circulation* 2012;125:1157–70; 2. Jensen et al. *J Am Coll Cardiol* 2014;63(25 Pt B):2985–3023; 3. Purcell et al. *Lancet Diabetes Endocrinol* 2014;2:954–62; 4. Villareal et al. *Am J Clin Nutr* 2005;82:923–34.

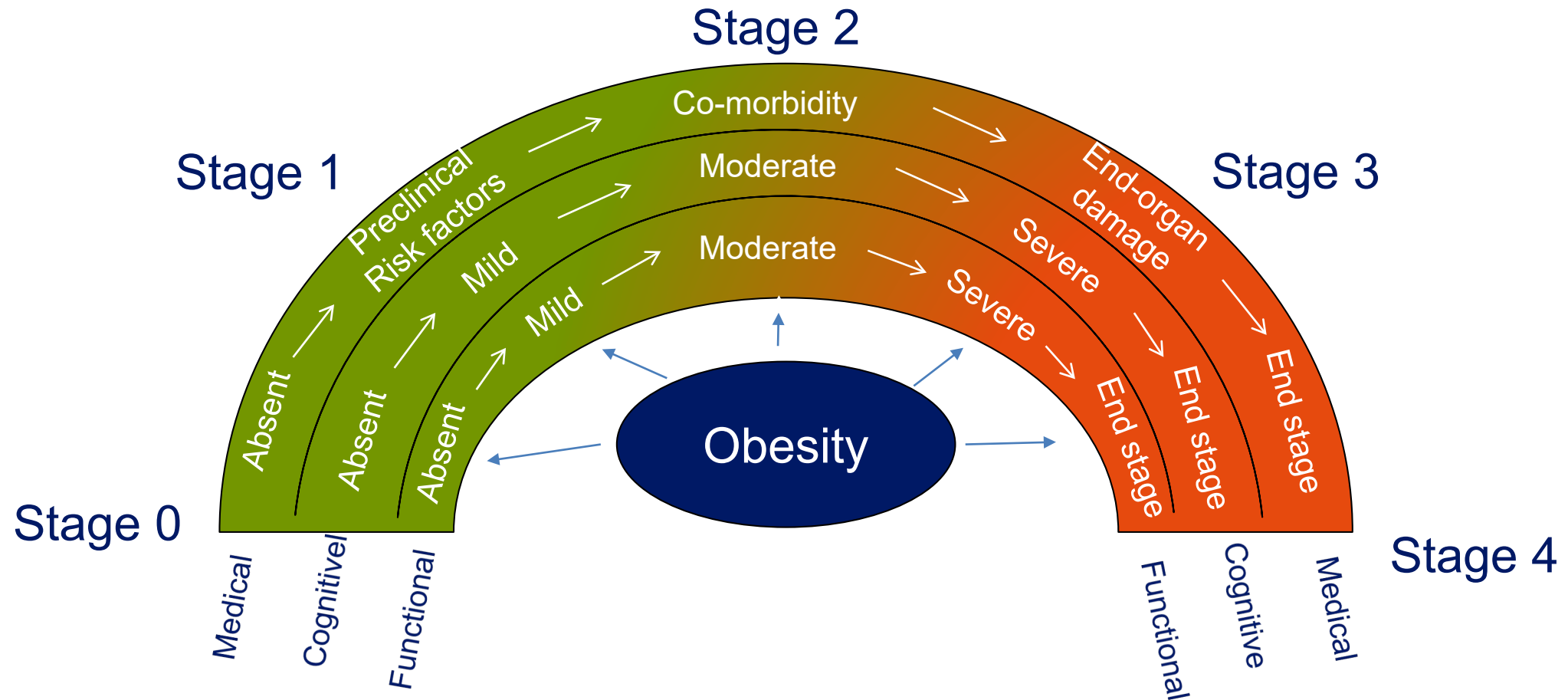
EASO European guidelines

Clinical care pathway for overweight and adults with obesity



*BMI and WC cut-off points are different for some ethnic groups. T2D, type 2 diabetes; WC, waist circumference

^{1,2}Edmonton Obesity Staging System: Assessing disease severity



Master clinician case discussion: Obesity Management in Adults

Edmonton Obesity Staging System

STAGE 0

- **NO** sign of obesity-related risk factors
- **NO** physical symptoms
- **NO** psychological symptoms
- **NO** functional limitations

Case Example:

Physically active female with a BMI of 32 kg/m², no risk factors, no physical symptoms, no self-esteem issues, and no functional limitations.

Class I, Stage 0 Obesity

EOSS Score

WHO Obesity Classification

STAGE 1

- Patient has obesity-related **SUBCLINICAL** risk factors (borderline hypertension, impaired fasting glucose, elevated liver enzymes, etc.) - *OR* -
- **MILD** physical symptoms - patient currently not requiring medical treatment for comorbidities (dyspnea on moderate exertion, occasional aches/pains, fatigue, etc.) - *OR* -
- **MILD** obesity-related psychological symptoms and/or mild impairment of well-being (quality of life not impacted)

Case Example:

38 year old female with a BMI of 59.2 kg/m², borderline hypertension, mild lower back pain, and knee pain. Patient does not require any medical intervention.

Class III, Stage 1 Obesity

STAGE 2

- Patient has **ESTABLISHED** obesity-related comorbidities requiring medical intervention (HTN, Type 2 Diabetes, sleep apnea, PCOS, osteoarthritis, reflux disease) - *OR* -
- **MODERATE** obesity-related psychological symptoms (depression, eating disorders, anxiety disorder) - *OR* -
- **MODERATE** functional limitations in daily activities (quality of life is beginning to be impacted)

Case Example:

32 year old male with a BMI of 36 kg/m² who has primary hypertension and obstructive sleep apnea.

Class II, Stage 2 Obesity

STAGE 3

- Patient has **significant** obesity-related end-organ damage (myocardial infarction, heart failure, diabetic complications, incapacitating osteoarthritis) - *OR* -
- **SIGNIFICANT** obesity-related psychological symptoms (major depression, suicide ideation) - *OR* -
- **SIGNIFICANT** functional limitations (eg: unable to work or complete routine activities, reduced mobility)
- **SIGNIFICANT** impairment of well-being (quality of life is significantly impacted)

Case Example:

49 year old female with a BMI of 67 kg/m² diagnosed with sleep apnea, CV disease, GERD, and suffered from stroke. Patient's mobility is significantly limited due to osteoarthritis and gout.

Class III, Stage 3 Obesity

STAGE 4

- **SEVERE** (potential end stage) from obesity-related comorbidities - *OR* -
- **SEVERELY** disabling psychological symptoms - *OR* -
- **SEVERE** functional limitations

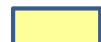
Case Example:

45 year old female with a BMI of 54 kg/m² who is in a wheel chair because of disabling arthritis, severe hyperpnea, and anxiety disorder.

Class III, Stage 4 Obesity

Treatment algorithm of pts. with overweight & obesity

EOSS	BMI < 30	BMI 30-35	BMI 35-40	BMI >40	Age (years)
STAGE 0					> 60
					< 60
STAGE 1				S	> 60
					< 60
STAGE 2				S	> 60
					< 60
STAGE 3			S	S	> 60
					< 60
STAGE 4					> 60
		S	S	S	< 60

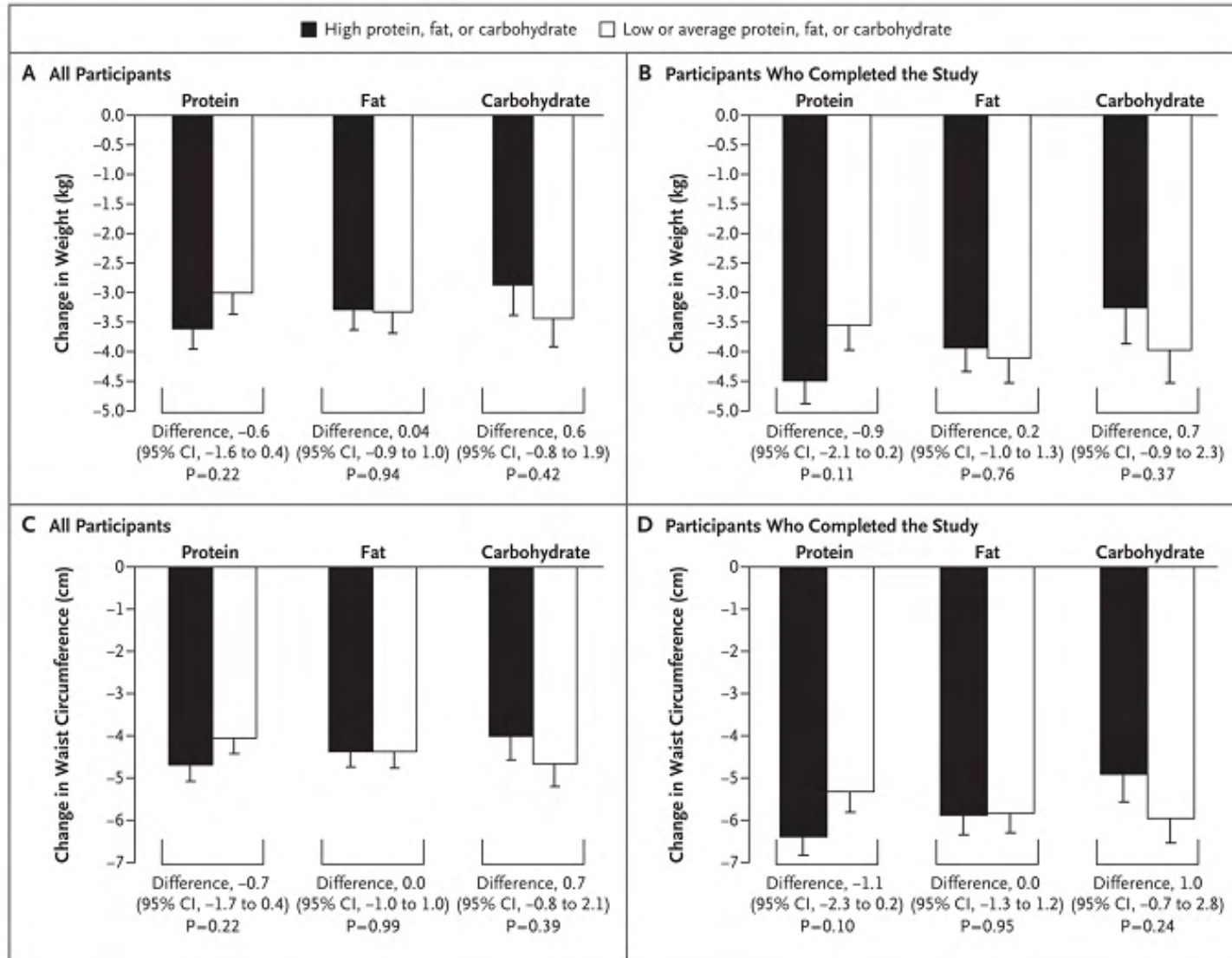
 lifestyle intervention

 rehabilitation (physical, neurological, cardiopulmonary, psychiatric)

 pharmacological therapy
(In patients with T2DM, is indicated the use of antidiabetic medications that have additional actions to promote weight loss, such as GLP-1 analogs).

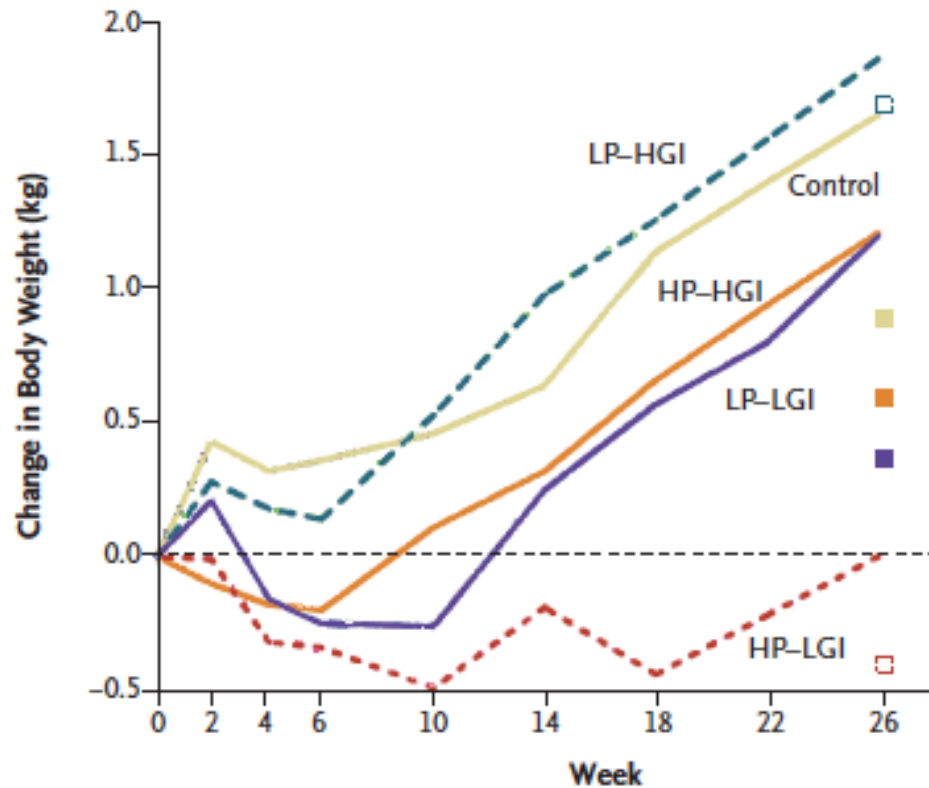
 bariatric surgery
S surgery to be considered in selected cases with favorable risk/benefit profile

Comparison of weight loss diets with different compositions of fat, protein & carbohydrates



Reduced calorie diets result in clinically meaningful weight loss regardless of which macronutrients they emphasize

Diets with high or low protein content & glycemic index for weight-loss maintenance



A modest increase in protein content and a modest reduction in the glycemic index led to an improvement in study completion and maintenance of weight loss

No.									
LP-LGI	150	116	121	118	112	104	101	97	106
LP-HGI	155	118	114	118	108	104	95	91	97
HP-LGI	159	132	136	131	125	116	118	114	124
HP-HGI	155	130	124	121	118	114	100	104	107
Control	154	126	131	125	131	125	118	110	114

Exercise training in management of overweight & obesity in adults: Evidence based recommendations

Recommendation	Grade
Body weight and body composition	
1. Weight and fat loss	
Advise preferentially an exercise training program based on 150 to 200 min of aerobic exercise at least at moderate intensity.	A
Advise an exercise training program based on HIIT (i) only after thorough assessment of cardiovascular risk and (ii) with supervision.	B
Inform persons with overweight or obesity that expected weight loss is on average not more than 2 to 3 kg.	A
2. Weight maintenance after weight loss	
Advise a high volume of aerobic exercise (200 to 300 min/week of moderate-intensity exercise).	E
3. Preservation of lean body mass during weight loss	
Advise an exercise training program based on resistance training at moderate-to-high intensity.	A

Behavioral therapy prescription

Weight loss	Weight maintenance
Food intake and physical activity diary	Continue with diaries: random or daily
Weekly weight measurement	Twice a week or daily
DPP, *LookAHEAD	Prevent regain, individual problem solving
Routine feedback	Periodic feedbacks

*	Frequency of On-Site Visits	Format of Treatment Sessions	Weight Loss Goal	Activity Goal	Special Features
Phase I Months 1–6 Months 7–12	Weekly 3 per mo.	3 group, 1 individual. 2 group, 1 individual.	Lose $\geq 10\%$ of initial weight. Continued loss or weight maintenance.	Exercise ≥ 175 min/wk by mo. 6. Increase min/wk of activity; 10,000 steps/day goal.	Treatment toolbox Advanced toolbox options; orlistat.
Phase II Years 2–4	Minimum of 1 per mo.	1 individual with minimum of 1 additional contact by phone, mail, or e-mail.	Weight maintenance, reverse weight gain as it occurs.	Maintain high levels of physical activity.	Refresher Groups to reverse weight gain; National Campaigns across 16 centers.
Phase III Year 5+	Monthly Recommended.	individual	Prevention of weight gain.	Prevention of inactivity.	Refresher groups; Campaigns; open groups.

Telemedicine	Mindfulness
Motivational interviewing	Goal setting
Portion control	Cognitive behavioral therapy
Self monitoring	Psychological evaluation & counseling

Anti-obesity drugs

Clinical Information

European Guidelines for Obesity Management in Adults

Volkan Yumuk^a Constantine Tsigos^b Martin Fried^c
Karin Schindler^d Luca Busetto^e Dragan Micic^f
Hermann Toplak^g for the Obesity Management Task Force of
the European Association for the Study of Obesity

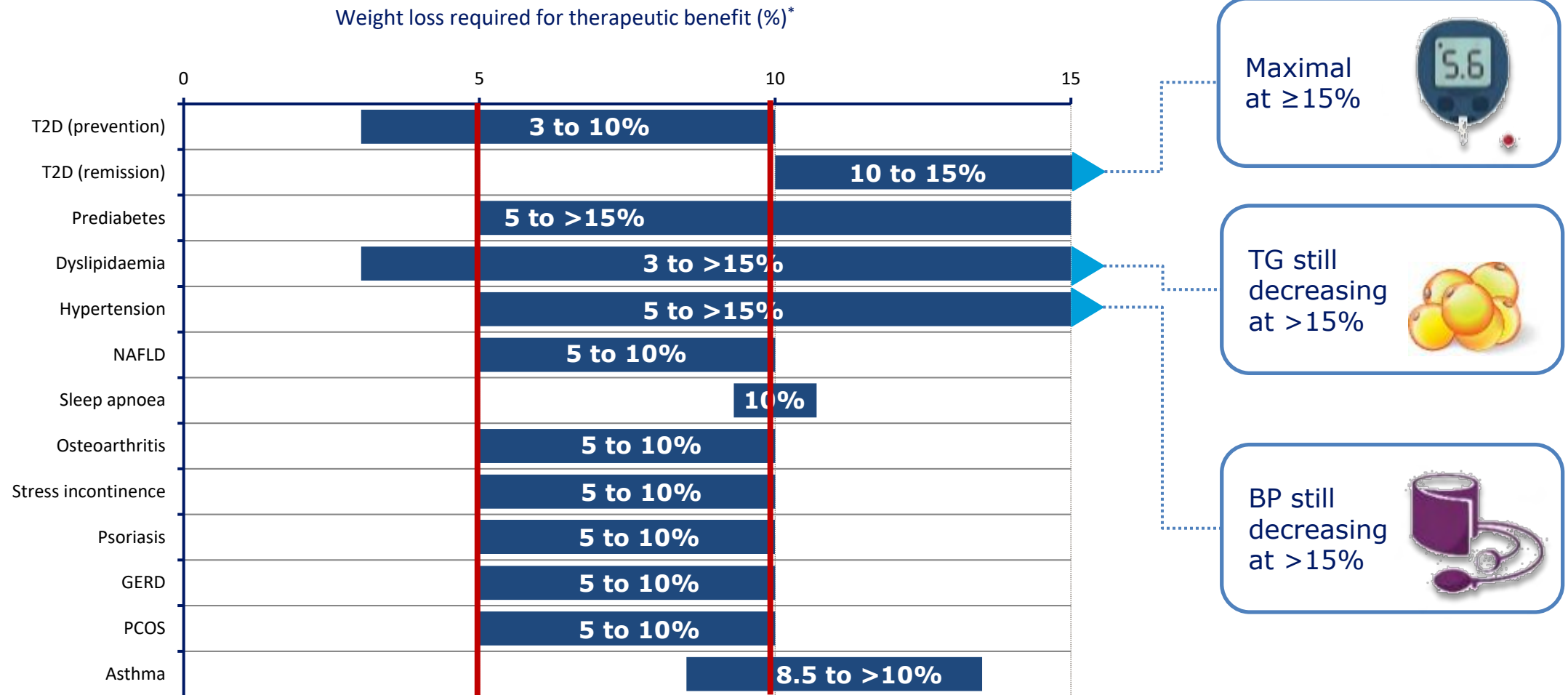
Drugs	Status	Mechanism	Dosing	Response evaluation	Warnings	Contraindications	Side-effects
Orlistat	FDA & EMA approved	pancreatic, gastric lipase inhibitor	120 mg tid 60 mg tid (OTC)	2.9–3.4% 1 year	hepatitis, liver failure (rare), concomitant multivitamin advised	pregnancy, breast feeding, chronic malabsorption syndrome, cholestasis	decreased absorption of fat soluble vitamins, steatorrhea, faecal urgency
^a Lorcaserin	FDA approved	5HT _{2c} R agonist	10 bid	3.6% 1 year stop if <5% weight loss at 12 weeks	serotonin syndrome, cognitive impairment, depression, valvulopathy hypoglycaemia, priapism	pregnancy, breast feeding, use with caution: MAOIs, SSRIs, SNRIs	headache, nausea dry mouth, dizziness fatigue, constipation
Phentermine/ topiramate	FDA approved	NE release (P) GABA modulation (T)	starting dose: 3.75/23 qd recommended dose: 7.5/46 qd *high dose: 15/92 qd	6.6% (recommended dose) 1 year 8.6% (high dose) 1 year stop if <5% weight loss at 12 weeks	fetal toxicity, acute myopia, cognitive dysfunction, metabolic acidosis, hypoglycaemia	pregnancy, breast feeding, glaucoma, hyperthyroidism, use with caution: MAOIs	insomnia, dry mouth constipation, paresthesia, dizziness, dysgeusia
Bupropione/ naltrexone	FDA & EMA approved	DA/NE reuptake inhibitor(B) opioid antagonist (N)	8/90 mg tb 2 tb bid	4.8% 1 year stop if <5% weight loss at 12 weeks	fetal toxicity, increased seizure risk, glaucoma, hepatotoxicity	uncontrolled hypertension, seizure, anorexia nervosa / bulimia, drug or alcohol withdrawal, use with caution: MAO inhibitors	nausea, constipation, headache, vomiting, dizziness
Liraglutide	FDA & EMA approved	GLP-1 agonist	3 mg sc	5.8 kg 1 year stop if <4% weight loss at 14 wks	acute pancreatitis, acute gall bladder disease	medullary thyroid cancer history, MEN type 2 history	nausea, vomiting, pancreatitis

FDA = Food & Drug Administration; EMA= European Medicinal Agency; OTC = over the counter; 5HT_{2c}-R = 5 hydroxytryptamine 2c receptor; MAOI = monoamine oxidase inhibitor; SSRI = selective serotonin reuptake inhibitor; SNRI = serotonin norepinephrine reuptake inhibitor; NE = norepinephrine; GABA = gamma amino butyric acid; DA = dopamine; GLP-1 = glucagon-like peptide-1; MEN = multiple endocrine neoplasia.

*Careful observation.

^aLorcaserin is no longer used due to increases in certain cancers

Weight Loss Target



Adapted from: AACE/ACE Obesity CPG, *Endocr Pract.* 2016;22(Suppl 3); Cefalu et al. *Diabetes Care* 2015;38:1567–82; Lean et al. *Lancet* 2018;391:541–51; le Roux et al. *Lancet.* 2017 Apr 8;389(10077):1399–1409; Mahil SK, et al. *Br J Dermatol.* 2019 Nov;181(5):946–953; Dias-Junior et al. *Eur Respir J.* 2014;43(5):1368–77

Clinical pearls

- Obesity is a multifactorial chronic relapsing disease generating from genetic, epigenetic, biological, psychologic and sociocultural interactions (not lack of will power).
- BP first objective is <140/90mmHg, DBP for all is <80mmHg
- Hypertension should be treated before it causes end organ damage
- The target for weight loss should be 5-15% and must be maintained for health gains
- Holistic weight management can help maintain weight loss and management of obesity complications. An accredited obesity center is a requisite
- Post treatment follow up is one of the the keys to success