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Bariatric Assessment

Advanced Care Paramedicine

Module: 02

Section: 04

Objectives

- Define “bariatric patient”
- Describe the effects of obesity
- List the appropriate assessment techniques for the bariatric patient.

Bariatrics

- Bariatrics is the science of providing healthcare for those who have extreme obesity
- Both a patient's weight and the distribution of this weight throughout the body are involved in determining whether one is a bariatric patient

Bariatric Patient

- A bariatric patient is defined as anyone regardless of age, who has limitations in health and social care due to their weight, physical size, shape, width, health and mobility and a Body Mass Index (BMI) > 40 kg/m² and or are 40kg above ideal weight for height.

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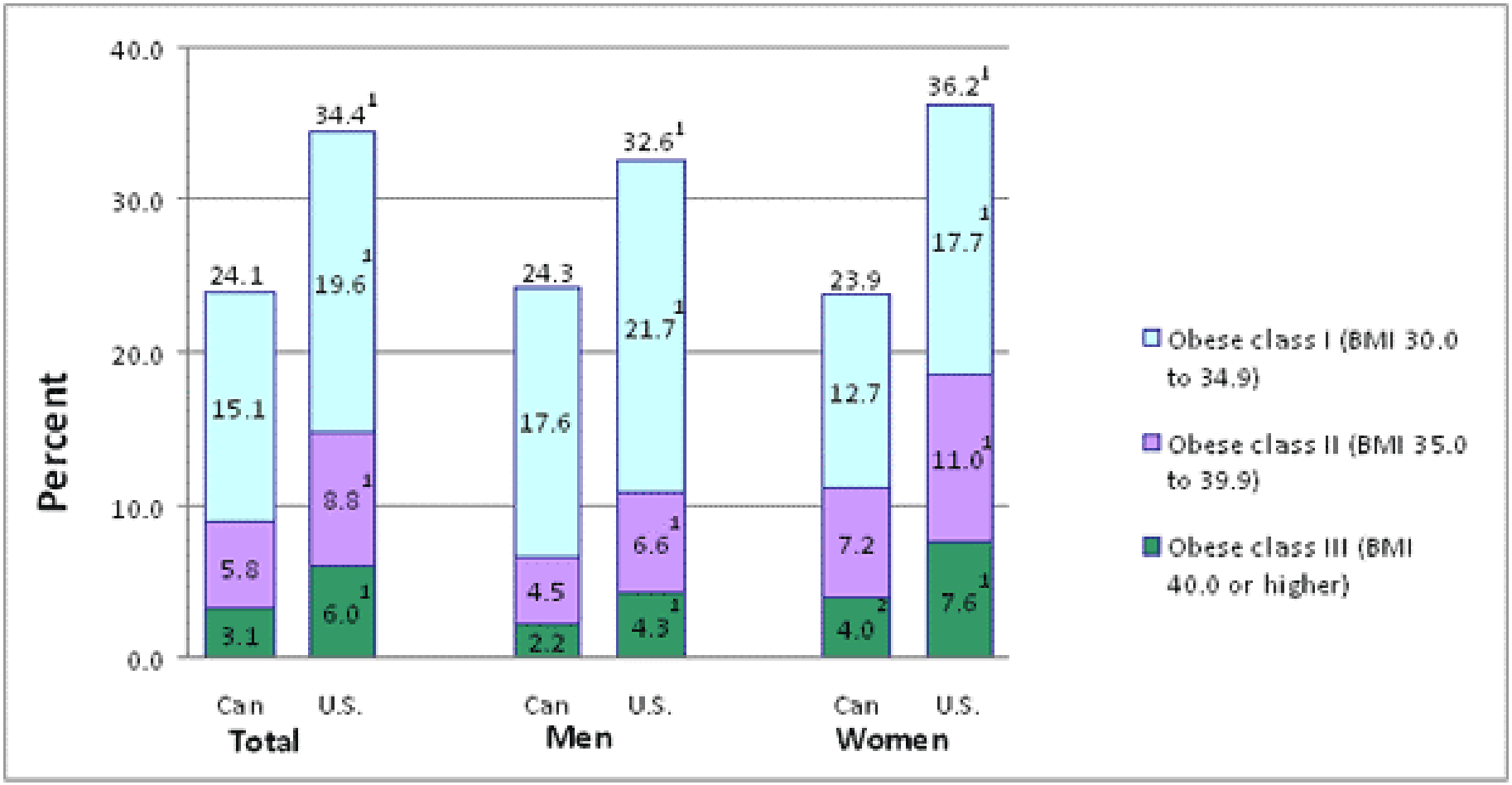
Statistics

Body mass index, overweight or obese, self-reported, adult, by age group and sex (Number of persons)

	2010	2011	2012	2013	2014
	number of persons				
Total, 18 years and over	**13,099,396**	**13,211,116**	**13,485,120**	**13,941,347**	**14,222,521**
Males	7,661,608	7,618,576	7,722,703	8,109,785	8,155,903
Females	5,437,788	5,592,540	5,762,416	5,831,562	6,066,618
18 to 19 years	187,940	183,433	188,870	173,473	199,623
Males	114,717	107,920	106,684	95,143	129,550
Females	73,222	75,513	82,185	78,330	70,073
20 to 34 years	2,573,610	2,624,762	2,709,110	2,772,702	2,768,988
Males	1,608,859	1,626,667	1,673,988	1,753,417	1,731,932
Females	964,751	998,095	1,035,122	1,019,285	1,037,056
35 to 44 years	2,404,987	2,411,112	2,391,855	2,514,222	2,510,247
Males	1,510,783	1,428,959	1,476,840	1,568,605	1,518,826
Females	894,204	982,152	915,015	945,616	991,421
45 to 64 years	5,588,496	5,549,375	5,624,364	5,739,486	5,866,118
Males	3,258,305	3,240,279	3,213,664	3,309,785	3,325,475
Females	2,330,192	2,309,096	2,410,701	2,429,700	2,540,644
65 years and over	2,344,363	2,442,434	2,570,921	2,741,465	2,877,545
Males	1,168,944	1,214,750	1,251,527	1,382,834	1,450,121
Females	1,175,419	1,227,684	1,319,393	1,358,631	1,427,423

Statistics

Prevalence of obesity in adults aged 20 to 79, by sex: Canada, 2007 to 2009 and United States, 2007 to 2008



Weights

$$BMI = \frac{Weight\ (kg)}{(Height\ in\ meters)^2}$$

$$IBW(men) = 50\ kg + (2.3\ \frac{kg}{in}\ X\ height\ over\ 60\ inches)$$

$$IBW(women) = 45.5\ kg + (2.3\ \frac{kg}{in}\ X\ height\ over\ 60\ inches)$$

$$Dosing\ Weight = IBW + (0.4\ X\ (Actual\ - IBW))$$

If Actual < IBW, then Dosing Weight = Actual

Health Risks

Classification	BMI (kg/m^2)	Risk of Co-morbidities
Underweight	< 18.5	Low (but increased risk of other clinical problems)
Healthy Weight	18.6 – 24.9	Average
Overweight (pre-obese)	25.0 – 29.9	Increased
Obese (Grade I)	30.0 – 34.9	Moderate
Obese (Grade II)	35.0 – 39.9	Severe
Obese (Grade III)	> 40	Very Severe

Body Fat Mass

10 – 20 % Fat	20 – 25% Fat	25 – 30% Fat	30 – 40% Fat	>40% Fat
Healthy Weight	Overweight	Moderately Obese	Severely Obese	Morbidly Obese

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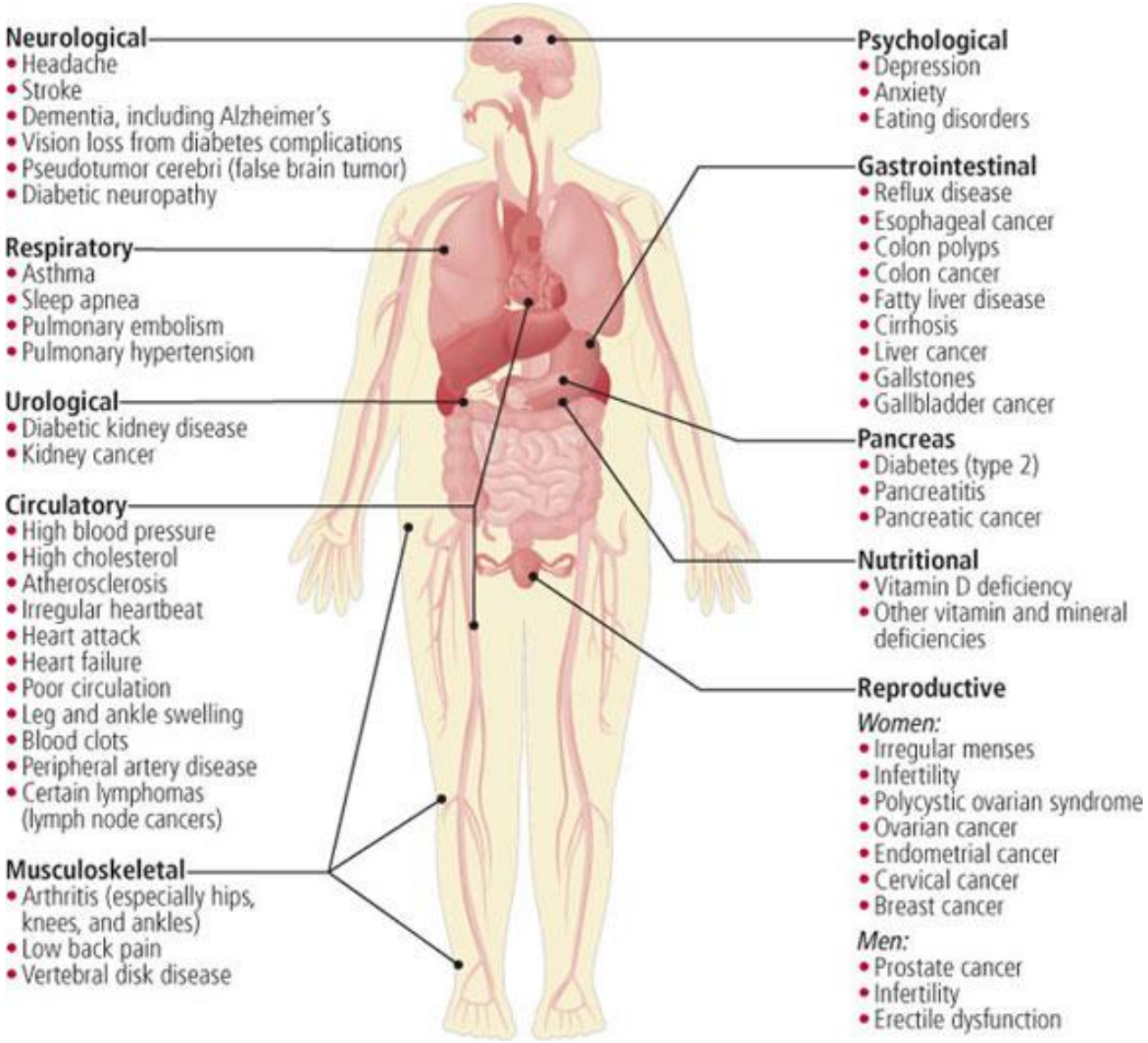
Affects of Obesity



Respiratory

- Restrictive lung pattern due to both increased pulmonary blood volume and increased chest wall mass
- Work of breathing exacerbated by:
  - Abnormal diaphragm position
  - Upper airway resistance
  - Increased daily CO_2 production
- ↓ FRC, ↓ TLC, ↓ VC, ↓ IC, ↓ MV, ↓ FVC, ↓ ERV
- ↑ FEV_1/FVC
- Strongly correlated with obstructive sleep apnea syndrome

Airway

- Difficult Ventilation
  - Facial structures (facial girth and excess adipose tissue) make it difficult to fit and seal mask
  - Redundant palatal and pharyngeal tissues
  - Smaller pharyngeal area due to adipose tissue
  - Increased tongue size
  - Tendency of obese men to have facial hair
  - Positioning

Airway

- 2 person/4 handed technique with OPA and NPA recommended
- Pressure required to ventilate manually with a BVM may simply not be possible
- Ramp head for better positioning

Airway

- Difficult intubation
  - Due to relatively short, wide necks and redundant oropharyngeal tissue
- Laryngeal mask airway or King LT may be preferred
- Parameters:
  - Delivered tidal volume should be calculated based on ideal body weight (IBW) rather than actual body weight (ABW) to avoid high airway pressures, alveolar overdistension, and barotrauma
  - End-tidal CO_2 monitors are unreliable because of widened alveolar-arterial gradients present in most obese patients
  - High FiO_2 initially
  - Tidal volume at 10 ml/kg based on IBW
  - Positive end-expiratory pressure (PEEP) 7 - 10 cmH_2O

Airway

- Tracheostomy
  - Technically demanding in obese patients because of the cervical anatomy
  - Difficult to determine accurate landmarks on a thick and obese neck
  - Increase in neck circumference, thickness of subcutaneous tissues, anatomical distortions, adipose tissue-distorting landmarks and inability to place the patient supine with head extended
  - Tracheostomy tubes typically too short to accommodate increased neck girth in obese patients

Circulation

- Physiological changes:
  - ↑ blood volume
  - ↑ vascular tone
  - ↑ afterload
  - ↓ LV contractility
  - Diastolic dysfunction
- Obscured landmarks may make assessing and monitoring pulse rate and blood pressure difficult
- Use of correct cuff sizes when attempting blood pressure measurements
- Tourniquets may not work well or may cut into the flesh if applied too tightly (use BP Cuff instead)
- External jugular access may be impossible due to difficulty in locating landmarks
- The reliability of the ECG may be affected by incorrect lead application due to loss of landmarks and inconsistent voltages.

CPR

- Follow current ILCOR Guidelines for Basic and Advanced Life Support
  - Airway
    - Adjust as recommended
  - Chest Compression
    - Advised compression depth of 4 – 5 cm
    - Do not wait until exhaustion occurs
  - Pharmacology
    - No change

Pharmacology

- Differences in renal blood flow and filtration function can cause drugs to be cleared more or less rapidly than anticipated
- Increased adipose tissue causes an increased distribution of lipophilic drugs that can lead to decreased serum levels, as well as prolonged elimination times
- As a general rule, anticipate the half-life of benzodiazepines and other sedatives to increase in obese patients
- However, actual recommendations for altering dosing in these patients is still an area of active research

Other System Changes

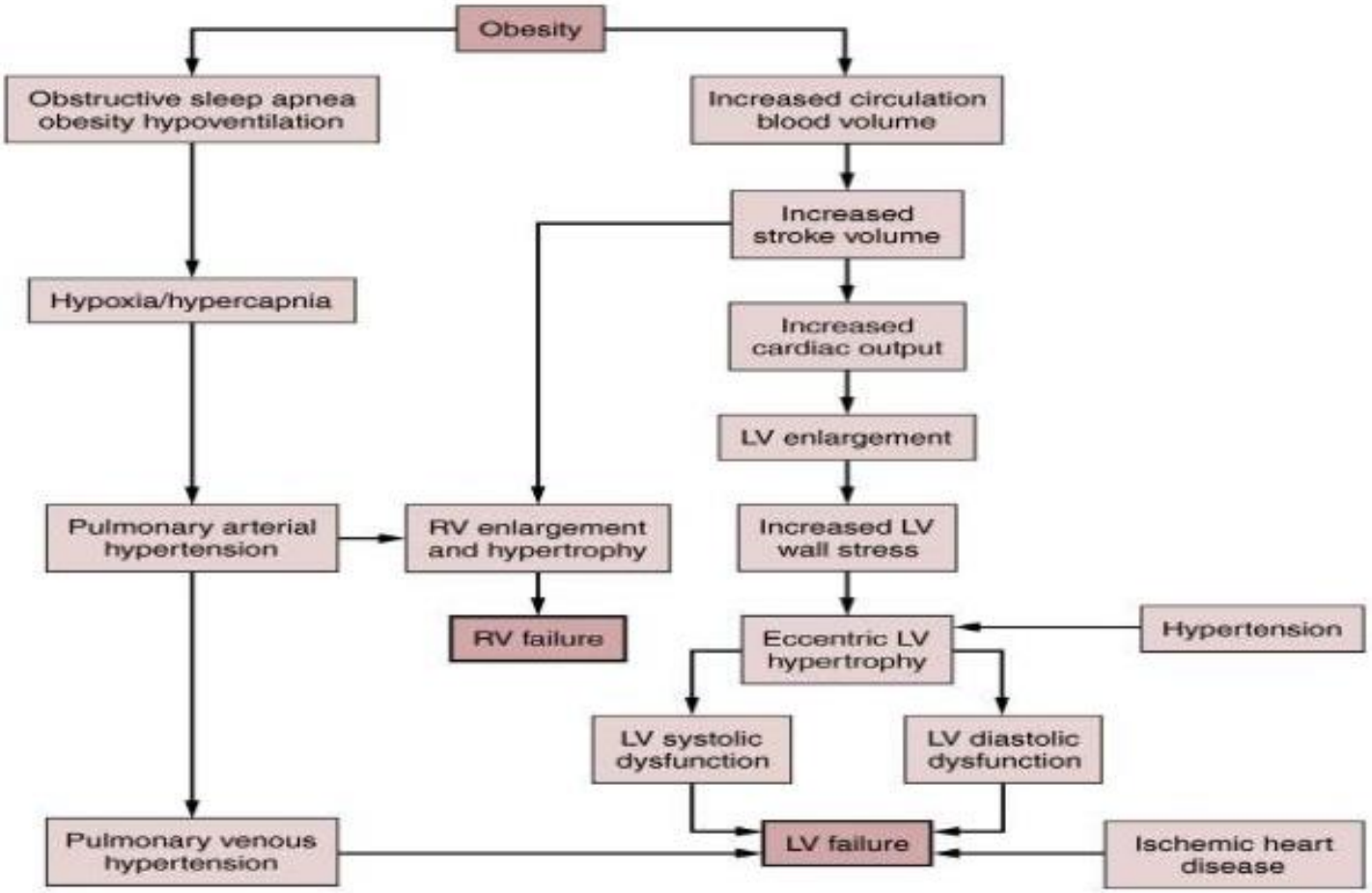
- Renal
  - ↑ Clearance of renal excreted drugs
  - Hypertensive and diabetic nephropathy
- Hematology
  - ↑ Fibrinogen
  - Venous stasis
- Gastrointestinal
  - Hiatal hernia
  - ↑ Gastric secretions
  - ↓ pH

Other System Changes

- Metabolic/Endocrine
  - ↑ Resting energy expenditure
  - Insulin resistance
- Immunology
  - Impaired neutrophil function

Other System Changes

CARDIOVASCULAR SYSTEM



Assessment techniques

- Treat the patient with dignity and respect.
- May require larger cuff size for obtaining BP and specialized equipment for moving.
- Include patient in assessment techniques for positioning of comfort and safety.
- Anticipate airway difficulty.

Bariatric Challenges

- Caring for the bariatric patients is challenging
- It puts workers at risk for injuries during repositioning, treatment and transport activities
- Many paramedic activities encountered while caring for bariatric patients readily exceed safe working-loads and can lead to:
  - Musculoskeletal injuries
  - Strains and sprains
  - Excessive spinal loading

Bariatric Transport challenges

- Traditional equipment can be unsafe and unaccommodating
- Plan an safe transport and work with a team
- Know the resources you have available (fire department, additional EMS personnel)
- Early notification to receiving hospital.

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Patient transfer and handling systems

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