BOSTON MEDICAL CENTER

Preoperative Optimization of a Spinal Surgery Patient

Eduard Vaynberg MD

Director of Pain Management

Department of Anesthesiology and Pain Management

Boston Medical Center

Assistant Professor of Boston University School of Medicine

Typical Patient

- 45 y.o male with six month of low back pain and lower extremity radiculopathy after lifting a heavy object at work. Flexion/extension X-rays show Grade 2 dynamic listhesis.
- Past medical history: 27 pack/years smoking, COPD, severe obesity BMI of 36 (5'11" 260 pounds) DM type 2 with HgA1c of 9, depression
- Medications: insulin and oral DM medications, oxycodone 10 mg as needed three times per day (45 morphine equivalents), NSAIDS, acetaminophen
- Tired of being in pain, wants surgery ASAP

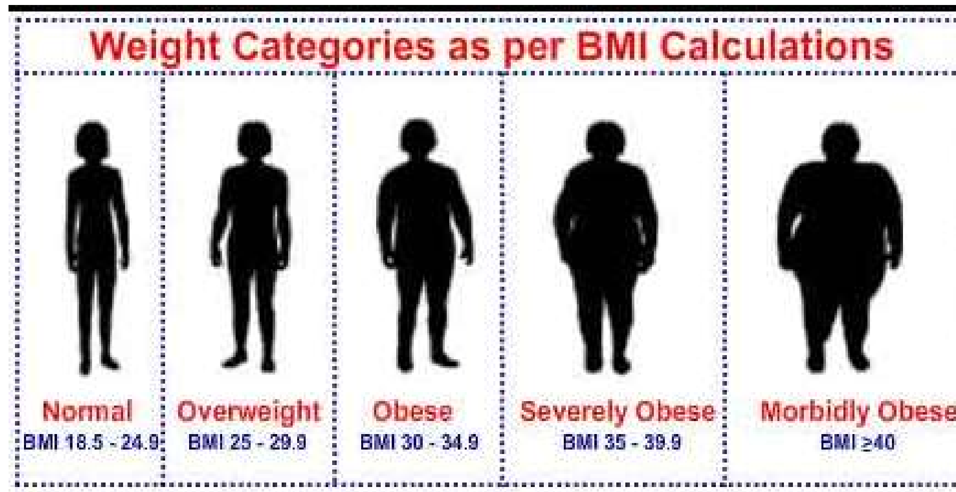
Parameters Amenable to Preoperative Optimization

	Goals	Interventions if Goals Not Met
Body mass index	<35 kg/m^2	Nutrition referral/diet and exercise program; consider bariatric consult if class III obesity
Serum albumin	>3.5 g/dL	Nutrition referral
Hemoglobin A1c	<7%	Endocrinology referral
Hemoglobin	>12 g/dL for women and >13 g/dL for men	Hematology referral, anemia workup
Vitamin D (25OHD)	>30 ng/mL	Endocrinology referral; initiate supplementation: 50 000 IU vitamin D weekly
DEXA	*T* score > −2.5 (ideally >−1.0)	Endocrinology referral; consider vitamin D/calcium supplementation versus anti-resorptive versus anabolic bone modulators
Morphine equivalents	<10 mg/day	Pain management referral, possible behavioral therapy
Nicotine	Nonsmoking	Smoking cessation, cognitive-behavioral therapy, pharmacological intervention

Abbreviations: 25OHD, 25-hydroxyvitamin D; DEXA, dual-energy radiograph absorptiometry.

Body Mass Index

- Obesity with BMI>35 is an independent risk factor



- Obesity related comorbidities: Diabetes type II, coronary artery disease, pulmonary disease
- SPORT trial (Spine Patient Outcomes Research Trial): increase in infection and revision rates
- Nonsurgical weight loss programs (diet and exercise program, counselling), vs surgical weight loss programs (insufficient evidence to recommend gastric bypass)

Malnutrition, Anemia, and Osteoporosis/Vitamin D deficiency

- Malnutrition leading to protein deficiency is rare in US
- Increase in infection with albumin<3.5
- Anemia with Hgb of less then 12 leads to increase in transfusions with large blood loss spine surgery thus increasing cost and length of stays
- Osteoporosis leads to bone implant failures in elective fusions
- Chronic vitamin D deficiency leads to osteoporosis
- 27% of spinal fusion patients are vitamin D deficient (<20 ng/ml) risk of nonunion is 3.4 times higher
- DEXA scores of T<1.0 lead to failure of instrumentation, proximal/junctional kyphosis
- Nutrition consult for optimization

Nicotine Consumption

- Negatively affect tissue perfusion and oxygen delivery leading to impaired wound healing, bone healing
- Impaired functional recovery
- Nicotine replacement product, counseling
- No data on exact timing
- Goal at least a month of smoking cessation perioperatively

Diabetes and Hyperglycemia

- Independent risk factors for infection of the surgical sites
- Impaired oxygen delivery due to hemoglobin glycosylation leading to tissue ischemia
- Hyperglycemia gets worse perioperatively due to stress hormones release
- Importance of tight perioperative control

Opioids and Psychosocial Factors

- Increased risk of opioid dependence in elective spine surgery patients
- No improvement in patient related outcomes with opioids
- Study of 440 patients on chronic preoperative opioids showed higher odds ratio of continued pain, 90-day complications and continued post op opioid use
- Increase in complications with increasing opioid dose
- Depression/anxiety highly associated with perioperative opioid use
- Depression/anxiety independently correlate with lesser improvement in functional outcomes
- Mental health/pain management physician consults to avoid increase in preoperative opioid escalation