Overview

- Bipolar disorder made up of four subtypes that differ in the intensity of mania, as well as the presence or absence of depression.
- There can be a reduced need for sleep, racing thoughts, impulsivity, and mood swings.
- Strong link to family history, as well as heightened illicit drug usage and alcohol abuse.
- Treatment often includes a mixture of antipsychotic medication, as well as mood stabilizers (e.g., lithium, anticonvulsants).
- Typical antipsychotics utilize dopamine antagonism and are plagued with EPS (e.g., tardive dyskinesia).
- Atypical antipsychotics utilize serotonin antagonism with less dopamine effect, leading to fewer EPS manifestations.
- EPS can be treated with anticholinergics such as benztropine 2 mg or diphenhydramine 50 to 100 mg.
- Neuroleptic malignant syndrome is a rare but fatal sequelae of large doses of antipsychotics.
- Mood stabilizers such as lithium uniquely cause thirst, polyuria, weight gain, and the gambit of side effects following diabetes insipidus.

Etiology

- Clear genetic association within first-degree family members.
- Environmental factors play into the epigenetic realm of manic breaks in the disease, including stressors, altered sleep cycle, and substance abuse.
- Disruption in neurotransmitters such as serotonin and norepinephrine likely play a role.

Usual Treatment

- Aimed at managing acute manic events, depressive symptoms, and long-term mood stabilization.
- Lithium, the most commonly used mood stabilizer, is dosed at 900 to 1800 mg orally per day, with the second most common being valproate dosed at 1000 to 3000 mg orally per day.
- Additionally, antipsychotic medications added to mood stabilizers for superior effects versus monotherapy alone.
- Most effective drugs for controlling acute manic episodes: Haloperidol (typical), risperidone, olanzapine, and quetiapine (atypical).
- Behavioral and cognitive psychotherapy.
- Electroconvulsive therapy: the treatment of choice for pts with severe mania refractory to pharmacotherapy.
- Indicated when rapid recovery is required.

Assessment Points

System	Effect	Assessment by Hx	PE
CV	QT prolongation Orthostatic hypotension	Dizziness Dizziness	Orthostatic hypotension Postural BP changes
GI	Liver dysfunction	Alcohol and medication use	Bleeding and jaundice
HEME	Agranulocytosis	Frequent infection	Mild fever
ENDO	Diabetes insipidus Hyperlipidemia	Polydipsia, polyuria	Signs of dehydration
NEURO	EPS	Typical antipsychotic usage	Dystonia, bradykinesia,akathisia, tardive dyskinesia
GENERAL	NMS	Medication usage or change	Hyperthermia, rigidity, autonomic instability, cardiac arrhythmia
	Stevens-Johnson syndrome Toxic epidermal necrolysis	Carbamazepine or lamotrigine use	Fever, rash, blisters

Key References: Price AL, Marzani-Nissen GR: Bipolar disorders: a review, *Am Fam Physician* 85(5):483–493, 2012; Geddes JR, Miklowitz DJ: Treatment of bipolar disorder, *Lancet* 381(9878):1672–1682, 2013.

Perioperative Implications

Preoperative Preparation

- Mental status must be assessed in preop planning.
- Mood stabilizers and antipsychotic regimen should remain the same with lithium level; check if concerned.

Monitoring

- Routine

Airway

- Standard protocol

Preinduction/Induction

- Variable outcomes by institution; standard approach needed

Maintenance

- Thermodysregulation risks: monitor temperature and treat symptoms.
- Adequate, but not excessive urine output.
- Hypotension, tachycardia, and arrhythmia.

Extubation

- Standard practice

Anticipated Problems/Concerns

- Polypharmacy is regularly practiced to control bipolar disorder, and these drugs must be carefully titrated and monitored in the preop and postop settings.
- Psychiatric and mental assessment should be regularly performed to monitor compliance and understanding.
- Cardiac arrhythmia, BP instability, and neuropsychiatric symptom exacerbation.
- Hypothyroidism and diabetes insipidus.
- Regional not a good choice with this disorder.
- Postop adherence and medication changes.

Blebs and Bullae

Trent Bryson

Risk

- Prevalence of blebs as high as 6% of young, healthy adults, although spontaneous rupture occurs only in 7.4 to 18 per 100,000.
- Incidence of ruptured bulla is 26 per 100,000.
- Increased incidence of primary disease in young males.
- Increased prevalence with smoking (Hx, including tobacco and illicit substances), COPD, chronic bronchitis, cystic fibrosis, lung cancer, staphylococcal pneumonia, tuberculosis, Marfan syndrome, Ehlers-Danlos syndrome, alpha-1 antitrypsin deficiency, sarcoidosis, fiberglass pneumoconiosis, and BMI <22.

Perioperative Risks

- Pneumothorax
- Bronchopleural fistulae
- Caval compression of nonruptured giant bulla
- Pulm Htn and RV failure
- COPD

Worry About

- CV collapse from tension pneumothorax
- Expanded dead-space ventilation
- Inability to adequately ventilate due to bronchopleural fistula
- Inadequate venous return from caval compression
- Expansion of bulla leading to compressive effects or rupture

Overview

- *Bleb* usually refers to a collection of air caused by ruptured alveoli within the visceral pleura without any other lining that is <1 cm in size.
- Bullae >1 cm in size and arise from various sources, which cause destruction of lung parenchyma.
- Nitrous oxide is contraindicated, and positive pressure ventilation should be avoided if possible.
  - Nitrous oxide 35 times more soluble than nitrogen in blood. Because of this, nitrous oxide readily diffuses into any gas-filled cavity much more rapidly than nitrogen is absorbed, which leads to rapid expansion of pneumothoraces.

- In spontaneous ventilation, bullae are more compliant than normal lung tissue and preferentially fill. At higher pressures and volumes, bullae are much less compliant than normal lung and therefore have much higher peak pressures than normal tissue and are prone to rupture.

Etiology

- Primary: Unknown but may be genetic; more common in young males
- Secondary: Emphysema, smoking, lung cancer, cystic fibrosis, pneumonia, and tuberculosis

Usual Treatment

- No treatment for asymptomatic, incidental blebs
- First-time rupture of a bleb is treated conservatively, depending on size of pneumothorax; Varies from 100% O_2 to chest-tube placement
- Surgical treatment: indicated for ruptured blebs in those in high-risk occupations that involve frequent changes in barometric pressure or recurrent spontaneous pneumothorax
- Surgical treatment of bullae done for increasing SOB or recurrent pneumothorax
- Surgical approach: Usually VATS, but may require thoracotomy or median sternotomy; laser ablation and mechanical pleurodesis may be utilized

Assessment Points

System	Effect	Assessment by Hx	PE	Test
CV	CAD, pulm Htn, RV failure	Angina, DOE	Signs of RV failure (palpable PA, peripheral edema)	ECG, stress test, ECHO
RESP	Expiratory obstruction and air trapping V/Q mismatch Hypoxia, hypercarbia Pneumothorax	Exercise tolerance, cough	Pursed-lip breathing, tachypnea	CXR, ABGs, chest CT, V/Q scan
ENDO	Possible steroid use			Glucose
MS	Barrel-chested			

Key References: Bansal S, Surve RM, Venkatapura RJ: Anesthetic management of a paraparetic patient with multiple lung bullae, *J Neurosurg Anesthesiol* 26(1):85–86, 2014; Slinger PD, Campos JH: Anesthesia for thoracic surgery. In Miller RD, Eriksson LI, Fleisher LA, et al., editors: *Miller's anesthesia,* ed 7, Philadelphia, 2010, Churchill Livingstone, pp 1819–1888.

Perioperative Implications

Preinduction/Induction/Maintenance

- Optimize oxygenation and deliver bronchodilators if necessary.
- Regional or neuraxial anesthesia is preferential over general endotracheal anesthesia.
- Some associated conditions may have significant mucus plugging; fiberoptic bronchoscope with suction and irrigating capabilities may be useful.
- Careful attention to hemodynamic monitors and ventilator peak pressures and volumes is essential.
- Have a surgical team available during induction because this is most common time for pneumothorax to occur.
- Recent chest x-ray evaluation for severity of disease and progression is also essential.

Monitoring

- Routine
- Consider arterial line to recognize more rapidly signs of CV collapse from pneumothorax or caval compression

General Anesthesia

- Maintaining spontaneous ventilation through induction can minimize complications. Avoid the use of paralytics or consider mask induction or awake fiberoptic intubation techniques.
- Consider ketamine induction to maintain ventilation for IV induction.
- If disease is unilateral and positive pressure required, a double lumen endotracheal tube can allow you to isolate the diseased lung and not expose it to increased pressure.
- If positive pressure ventilation needed, pressure control ventilation at low pressures with higher rate may be useful, but beware of breath stacking.
- Allow adequate exhalation times to avoid breath stacking (auto-PEEP) by appropriately setting I:E ratio.
- Do not use nitrous oxide under any circumstance.
- Consider use of isoflurane because it is the most bronchodilating-inhalation agent; it may decrease pressure requirements or obstruction in COPD pts.
- Careful attention to spontaneous ventilatory rate and volumes before extubation.
- Avoid high airway pressures from fighting the ventilator.
- If pt paralyzed, assure full reversal before attempt to extubate.
- COPD pts may retain CO_2, so be careful not to drive $ETCO_2$ too low and prolong emergence.

Regional Anesthesia

- Preferred technique if possible for most cases.
- Optimize volume status.
- Watch for resp distress from loss of accessory resp muscles from neuraxial anesthesia.
- Epidural may be preferable to spinal to avoid loss of accessory muscles by slowly raising the level by interval dosing.
- Pleurodesis is exquisitely painful and often requires a thoracic epidural to control pain and assure adequate chest excursion during recovery.

Postoperative Period

- Beware of CO_2 narcosis in those who retain CO_2.
- Spontaneous rupture can occur at any time. Continue adequate monitoring and watch for sudden dyspnea, desaturation, and loss of unilateral breath sounds.

Anticipated Problems/Concerns

- Rupture of bleb or bulla will cause a pneumothorax, which may rapidly progress to tension.
- Treatment of choice for tension pneumothorax is needle thoracostomy in second to third intercostal space in midclavicular line (in line with the nipple of a male pt). Most failures of needle thoracostomy occur from placement of needle too medial into the mediastinum.
- Obstructive pulmonary pathology includes bronchoconstriction and accessory muscle use even in the spontaneously breathing pt.
- Positive pressure ventilation is to be avoided, and nitrous oxide is absolutely contraindicated.

Bleomycin Sulfate Toxicity

John F. Rompala

Risk

- Pts with a history of germ cell tumors, lymphomas, squamous cell carcinomas, Kaposi sarcomas, and cervical cancers treated with BLM
- Incidence of BLT is 10–40%; mortality is 1–2%
- Risk of BLT increases with total dose >400 unit, glomerular filtration rate <80 mL/min, or advanced tumor stage at time of diagnosis
- History of concurrent thoracic irradiation cisplatin administration
- Age greater than 40 y
- History of smoking or exposure to high FiO_2s

Perioperative Risks

- Exposure to high FiO_2 may increase risk of developing pneumonitis and potentially lethal ARDS in periop setting.
- Preexisting lung pathology in combination with low FiO_2 may result in hypoxia.
- Risk of pulm injury is greatest within about 8 mo of administration, but BLM likely confers an elevated lifetime risk of BLT.
- Pulm adverse events rarely related to the intrapleural or intralesional administration of BLM.