**Technology Topics 2007 Summary Text**

This is a summary – please consult full description for details

**ANESTHESIA DELIVERY SYSTEMS (ADS)**

**ADS Names and Brands**

BWH ADSs come from GE-Datex-Ohmeda and Draeger_Siemens

**Ventilators**

Fabius compensates for Circuit Compliance
Fabius will not compensate for Lung Compliance or Changes in lung compliance
SmartVent will compensate for changing circuit and lung compliance
Compliance will not impact spontaneous breathing much.

**Three Ventilator types at BWH**

Uncompensated Bellows Movement Control
Fresh Gas Flow decoupled
Inhaled tidal volume feedback control
SmartVent® will compensate for changing circuit and lung compliance

**Four Gas Flow Sensor Technologies at BWH**

Turbine Flow Sensor
Hot Wire Anemometer Flow Sensor
Differential pressure across an orifice Flow Sensor
Ultrasonic Flow Sensor

**Two Gas Sensor Technologies at BWH**

Circuit Oxygen Sensor is common and present on most Anes Machines
Calibrate Circuit Oxygen Sensor at 21%, check at 100%
Sampled Gas Sensor is present on all Anes Machines
Sampled Gas Monitor does not need user Calibration

**All Sampled Gas Monitors at BWH**

All Gas Sensor connections need to be tight
Loose Gas Sample Line will give incorrect gas readings
Positive Pressure Ventilation further confuses the incorrect gas readings
Tubing should be connected before monitor is turned on

**Sample Gas - what is done with it after it is analyzed**

Two Options - Sample Gas Return (SGR) or Sample Gas to WAGD
Older GE Modulus 2+ and SE have SGR connected to CO2 absorber
GE Aestiva and Aisys, Draeger Fabius need circuit adapters for SGR
Sample Gas to WAGD is available on all machines

**Leak Tests are confused by Sampled Gas and Sampled Gas Return**

Pre-Use check assesses leaks from breathing circuit
During Leak Test, be careful with Sample Gas and Sample Gas Return
Charcoal Anesthetic Agent Absorbers
Charcoal Absorbers can remove volatile agents from effluent gas
Outlying Anesthetizing Locations need innovative scavenging
Charcoal Absorbers absorb 50 g anesthetic
Charcoal Absorbers absorb almost same amount that vaporizer delivered
Charcoal Absorber will not function if excess gas is diverted elsewhere

Altitude affects Gases and Vaporizers
Partial pressure of anesthetic is what anesthetizes the patient
Partial pressure of oxygen is what oxygenates the patient
Barometric pressure decreases with altitude
Concentration-Delivery Vaporizers under-anesthetize at altitude
Nitrous oxide concentration under-anesthetizes at altitude
Oxygen concentration is not as effective at altitude
Partial Pressure Delivery Vaporizers perfectly anesthetize (Sevo, etc)
Approximate Partial Pressure Delivery Vaporizers (Tec 3) sl overdose

Oxygen Ratio Control differs among machines
GE Modulus 2+, Modulus SE, Aestiva use Chain Link and turn knob
Draeger Narkomed, Fabius, Apollo use N2O Flow restriction
You can but should not administer hypoxic gas mixture to patient
GE Aisys uses microprocessor calculation to keep Fresh Gas > 25% O2

Miscellaneous Technology Topics
Aestiva Absorber hides Oxygen Sensor and Water Dump Button
Negative Pressure Leak Test (NPLT) is sometimes required
Draeger Fabius Alarms can be confusing – Some of them work as follows
Please empty water trap in Fabius Ventilator hose
Please empty water from Aestiva water trap next to oxygen sensor
Use an HME whenever possible
Draeger Fabius and Apollo require Press Rotary Knob to Confirm vent settings
GE interface (SmartVent and Aisys) Confirms with Knob or selected Button
Backup O2 Tank is present on all Anes Machines
Leave Backup Tank Valve turned OFF except during testing
No Backup N2O tanks are present on Anes Machines at BWH
Nominal wall pressure is 55 psi for medical gases
SmartVent needs ADS to be switched off every 12 hours to zero transducers
Aisys needs ADS to be switched off every 24 hours
PEEP Valves are removable, easy to assemble, provide ZEEP if reversed
PEEP Valves ADD PEEP

Technology Documents are available
http://etherweb.bwh.harvard.edu/education/resources/technology_resources.php

If an Anes Machine or Monitor is not working, call for help
Anes Tech is first line of defense
Biomedical Engineering OR Team
Emergency - Page 1-1055
Elective – Call and leave message at 3-1987
Elective – Email  BWH Anes Biomed via Outlook

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