Patient Management During HFJV

GENERAL RULES

- HFJV ΔP (PIP - PEEP) is the primary determinant of $PaCO_2$. HFJV I-time and Rate are secondary.
- Resting lung volume (FRC supported by set PEEP) and mean airway pressure (MAP) are crucial determinants of PaO_2.
- Avoid hypercarbia and hypoxemia by using optimal PEEP (see "When to Raise" PEEP below).
- Minimize IMV at all times, using very low rates (typically 0 – 5 bpm), unless IMV is being used to recruit lung volume or stabilize FRC. In general, keep CV PIP at a level necessary to achieve a moderate chest rise.
- To overcome atelectasis, IMV rates up to 5 bpm can be used for 10 – 30 minutes. Thereafter, IMV rate should be dropped back to as close to 0 as possible.
- In general, keep CV I-time = 0.35 – 0.5 sec.
- If lowering CV rate worsens oxygenation, PEEP may be too low. Higher PEEPs and lower CV rates reduce risk of lung injury.
- Lower FiO_2 before PEEP when weaning until FiO_2 is less than 0.4.

SETTING	INITIAL	WHEN TO RAISE	WHEN TO LOWER
HFJV PIP	Whatever produces desired $PaCO_2$	To decrease $PaCO_2$	To increase $PaCO_2$ (Raise PEEP if necessary to keep SpO_2 constant)
HFJV Rate	420 bpm (neonates) 300 bpm (peds)	To decrease $PaCO_2$ in smaller patients with low compliance	To eliminate inadvertent PEEP or hyperinflation by lengthening exhalation time or to increase $PaCO_2$ when weaning
HFJV I-TIme	0.020 seconds	To increase delivered tidal volume and lower $PaCO_2$	0.020 is the minimum
CMV Rate	0 - 5 bpm	To reverse atelectasis as a temporary recruitment maneuver (3 – 5 bpm)	To minimize volutrauma, especially when air leaks are present, or to decrease hemodynamic compromise
CMV PIP	PIP necessary to achieve moderate chest rise	To reverse atelectasis or stabilize lung volume; PIP typically < HFJV PIP	To minimize volutrauma, especially when air leaks are present, or to decrease hemodynamic compromise
CMV I-Time	0.4 seconds	To reverse atelectasis or stabilize lung volume	To minimize volutrauma, especially when air leaks are present, or to decrease hemodynamic compromise
PEEP	7 – 12 cm H_2O (Neonates) 10 – 15 cm H_2O (Peds)	To improve oxygenation and decrease hyper-ventilation To find optimal PEEP: Raise PEEP until SpO_2 stays constant when switching from IMV to CPAP	Lower PEEP only • when it appears that cardiac output is being compromised; or • when oxygenation is adequate • FiO_2 < 0.4, and • when lowering PEEP doesn't decrease PaO_2
FiO_2	As needed	Raise as needed after optimizing PEEP	Lower FiO_2 in preference to PEEP when weaning until FiO_2 < 0.4.

Special Air Leak Considerations:

1. Minimize IMV by using HFJV and adequate CPAP.
2. If oxygenation is compromised AND expiratory time has been optimized, raise PEEP, even if the lungs appear to be over-expanded on x-ray.