

VOLUME GUARANTEE VENTILATION IN THE NEONATES

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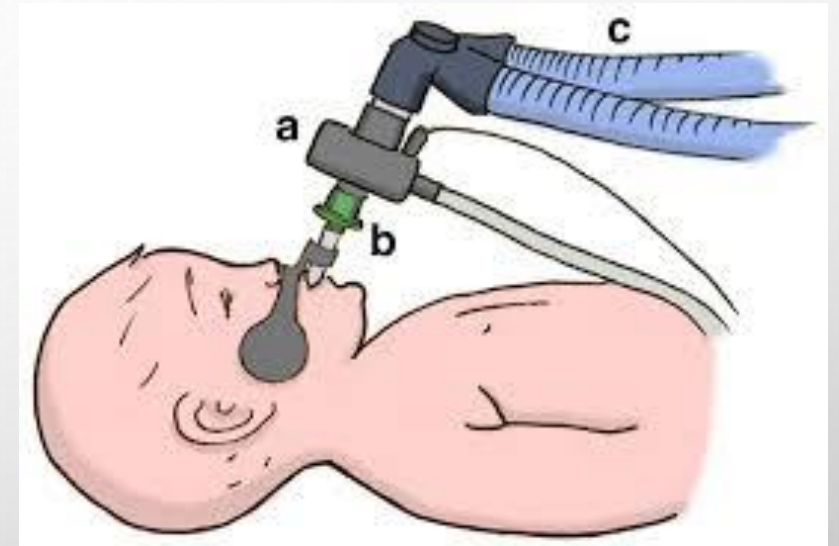
OBJECTIVES

- **PROBLEMS PARTICULAR TO VENTILATING NEONATES**
- **VOLUME-CONTROLLED VENTILATION**
- **PRESSURE LIMITED-CONTROLLED VENTILATION**
- **ADVANTAGES AND DISADVANTAGES OF VOLUME-CONTROLLED AND PRESSURE-LIMITED VENTILATION**
- **WHAT IS VOLUME GUARANTEE AND HOW DOES IT WORK?**
- **POTENTIAL ADVANTAGES OF USING VOLUME GUARANTEE VENTILATION**



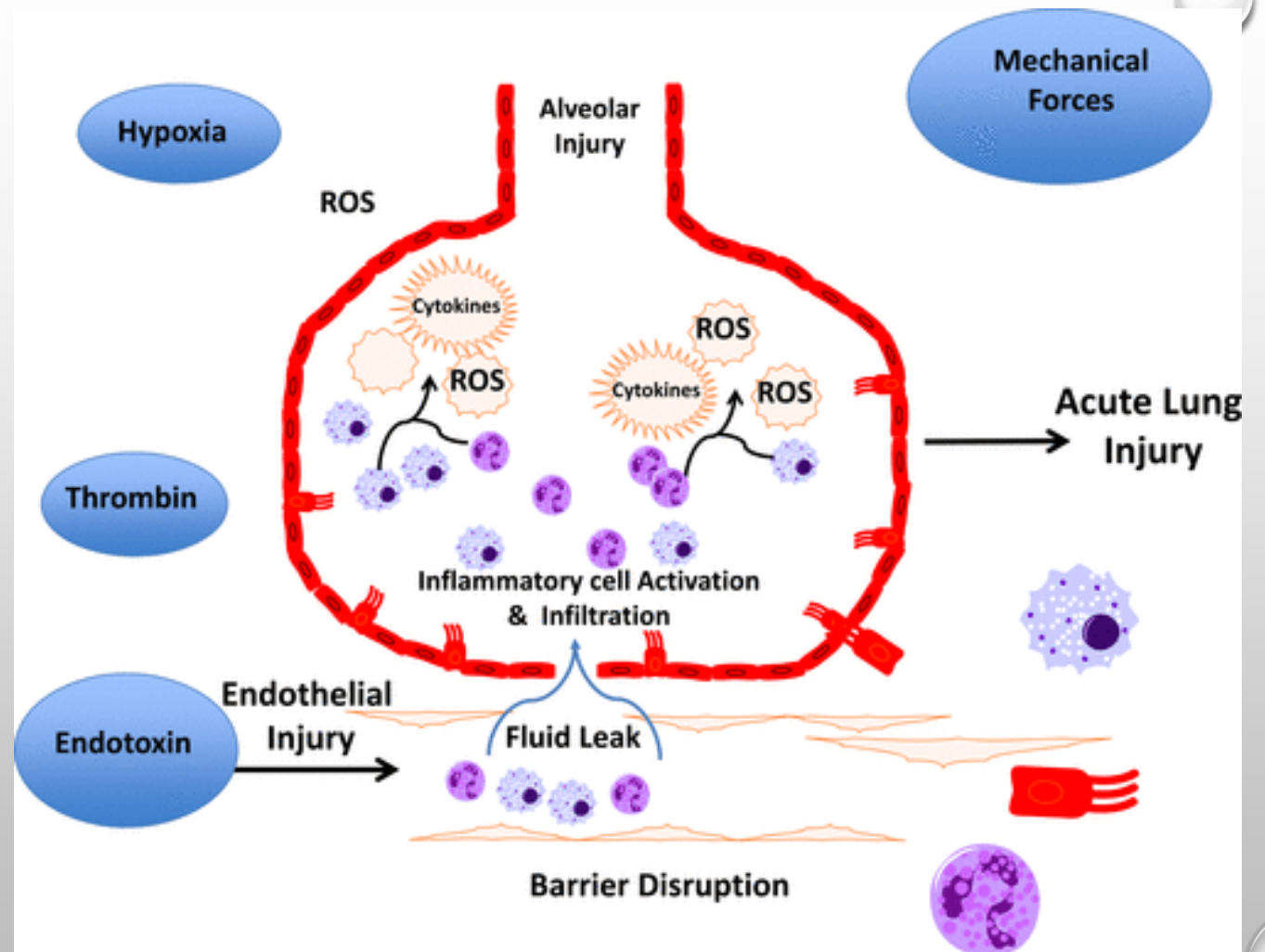
WHAT IS THE STORY ABOUT TIDAL VOLUMES

- IN NEONATES, THE AVERAGE TIDAL VOLUME IS THOUGHT TO BE 4–6 ML/KG
- ANATOMIC DEAD SPACE IS 3.3 ML/KG
- CONVENTIONAL RATES OF POSITIVE PRESSURE VENTILATION AND TIDAL VOLUME LESS THAN OR CLOSE TO TOTAL DEAD SPACE WOULD PRODUCE INSUFFICIENT EXCHANGE OF ALVEOLAR GASES, NO MATTER WHAT THE RESPIRATORY RATE AND MINUTE VOLUME
- SMALL TIDAL VOLUMES WOULD ALSO LEAD TO:
 - PROGRESSIVE ATELECTASIS
 - DETERIORATING VENTILATION-PERFUSION MATCHING
 - IMPAIRED OXYGENATION



OTHER PROBLEMS WITH TIDAL VOLUME DELIVERY

- VOLUME ASSOCIATED LUNG INJURY
- VENTILATOR ASSOCIATED LUNG INJURY
- ATELECTRAUMA
 - LUNG INJURY CAUSED BY HIGH SHEAR FORCES FROM CYCLIC OPENING AND COLLAPSE OF ATELECTATIC BUT RECRUITABLE LUNG UNITS
- BAROTRAUMA
 - LUNG INJURY CAUSED BY HIGH TRANSPULMONARY PRESSURE
- MAY LEAD TO LUNG INJURY SUCH AS PULMONARY INTERSTITIAL EMPHYSEMA AND PNEUMOTHORACES, THESE AIR-LEAK SYNDROMES THEMSELVES



SUMMARY: WHY WORRY ABOUT TIDAL VOLUME?

Tidal volume less than or close to total dead space would produce insufficient exchange of alveolar gases.

Too large a tidal volume may produce alveolar and airway overdistention and shear stress damage.

Lung overstretching and overdistension are significant in causing lung injury rather than high pressures alone; volume trauma is important as well as barotrauma.



PROBLEMS WITH VENTILATING THE NEONATE

- NEWBORN INFANTS ARE VENTILATED USING UNCUFFED ENDOTRACHEAL TUBES
- VARIABLE LEAK AROUND THE ENDOTRACHEAL TUBE, DEPENDING ON INSPIRATORY PRESSURE, NECK POSITION AND POSITION OF THE ENDOTRACHEAL TUBE ITSELF





PROBLEMS WITH VENTILATING THE NEONATE

- POOR COMPLIANCE OF THE INFANT LUNG COMPARED TO THE VENTILATOR CIRCUIT COMPLIANCE
- THE TIDAL VOLUME DELIVERED TO THE LUNGS CAN BE MANY TIMES SMALLER THAN THAT DELIVERED TO THE PATIENT CIRCUIT



VOLUME-CONTROLLED VENTILATION

Clinician selects

tidal volume 4-6ml/kg

Rate: 40-60/minute

I time 0.3-0.5s

PEEP: 4 cm of H₂O OR 5-6
cm if FiO₂ > 0.90

FiO₂: 0.4 to 1.0,
depending on the clinical
situation.

Termination of inspiration
is affected by the preset
VT having been delivered
or by a maximum
inspiratory time having
elapsed

High pressure limit





VOLUME- CONTROLLED VENTILATION

- THERE ARE SEVERAL ADVANTAGES AND DISADVANTAGES OF VOLUME-CONTROLLED VENTILATION.
- MOST SIGNIFICANT ADVANTAGE IS THAT IN THE FACE OF RAPIDLY CHANGING LUNG COMPLIANCE, FOR EXAMPLE DUE TO SURFACTANT THERAPY, CHANGING DISEASE STATE, POSTURE, ETC., THE ACTUAL TIDAL VOLUME DELIVERED TO THE PATIENT CIRCUIT REMAINS CONSTANT.
- BASIC VENTILATOR PARAMETERS CAN BE SET PRIOR TO PLACING THE PATIENT ON THE VENTILATOR, IN THE KNOWLEDGE THAT IF THESE SETTINGS ARE APPROPRIATE A PREDICTABLE VT WILL BE DELIVERED.
- MAJOR DISADVANTAGE IS THAT HIGH AIRWAY PRESSURES MAY BE GENERATED, POTENTIALLY RESULTING IN BAROTRAUMA.





PRESSURE LIMITED- CONTROLLED VENTILATION

- TIME-CYCLED, PRESSURE-LIMITED (TCPL) VENTILATION
- FLOW CAN BE VARIABLE OR CONSTANT
- ACTUAL VT THAT IS DELIVERED DURING A PRESSURE TARGETED INFLATION IS VARIABLE AND DEPENDS ON THE SET DRIVING PRESSURE, THE PULMONARY MECHANICS, AND THE SPONTANEOUS EFFORT OF THE INFANT
- ADVANTAGES
 - REDUCE THE RISK OF BAROTRAUMA
 - LESS INFLUENCED BY LEAKS LIKE VOLUME CYCLED VENTILATION
- DISADVANTAGES
 - VARIABILITY IN DRIVING PRESSURE CAN CREATE BOTH HYPO AND HYPERCAPNEA



IF YOU USE PRESSURE LIMITED VENTILATION, WHAT PEAK PRESSURE WILL YOU USE WITH A NEW ADMISSION?

- PICK UP PRESSURE AND THEN WATCH THE CHEST MOVE AND THEN ADJUST THE PRESSURE BASED ON BLOOD GASES
- PEAK INSPIRATORY PRESSURE (PIP) - DETERMINED BY ADEQUATE CHEST WALL MOVEMENT.
- AN INFANT WEIGHING LESS THAN 1500 GRAMS: 16-28 CM H₂O.
- AN INFANT WEIGHING GREATER THAN 1500 GRAMS: 20-30 CM H₂O.
- THE PROBLEM IS WITH THE SET PEAK AIRWAY PRESSURE THE VOLUME WILL ALWAYS CHANGE BASED ON COMPLIANCE AND RESISTANCE
- MODERN NEONATAL VENTILATION NEEDS TO TARGET THE EXPIRED TIDE VOLUME AND NOT THE PEAK INSPIRATORY PRESSURES
- SOME OF THE INFLATION TIDE VOLUME IS LOSS WITH ENDOTRACHEAL TUBE LEAKS

HOW TO CONTROL OXYGENATION

- GAS DOES NOT NEED TO MOVE IN AND OUT OF THE LUNG, SO IT IS NOT CONTROLLED BY TIDAL VOLUME.
- JUST NEED: – OXYGEN IN THE LUNG – ENOUGH SURFACE FOR OXYGEN TO DIFFUSE INTO BLOOD – BLOOD FLOWING THROUGH THE ALVEOLAR CAPILLARIES
- IF BABY IS HYPOXIC
 - INCREASE FIO₂
 - OPEN THE LUNG - PEEP OR CPAP OR MEAN AIRWAY PRESSURE



HOW TO CONTROL CO₂

- MOVE GAS IN AND OUT OF THE LUNG TO REMOVE CO₂
- THIS IS CONTROLLED BY
 - TIDAL VOLUME
 - VENTILATOR RATE / SPONTANEOUS RATE
 - ASSISTING BABY'S BREATHING
- TREATMENT OF HYPERCARBIA OR HYPOCARBIA
 - ALTER TIDAL VOLUME
 - ALTER VENTILATOR RATE



NOW VENTILATORS ACCURATELY MEASURE

- INSPIRED TIDAL VOLUME
- EXPIRED TIDAL VOLUME
- ENDOTRACHEAL TUBE LEAK
- INFLATION, INSPIRATION, EXPIRATION TIMES AND PRESSURES.
- SHOULD WE CHANGE TO CONTROLLING TIDAL VOLUME OR IS PRESSURE LIMITED VENTILATION GOOD ENOUGH?
- A SET PIP CANNOT NOT DELIVER A SET TIDAL VOLUME BECAUSE BABY BREATHEs, CRIES, OBSTRUCTS, IS APNEIC, AND COMPLIANCE CHANGES.

WHAT IS VOLUME GUARANTEE VENTILATION?

- VOLUME CONTROLLED VENTILATION IS UNPREDICTABLE DUE TO CIRCUIT COMPRESSION AND LEAKS
- VOLUME- TARGETED VENTILATION (VTV) STRATEGIES AIM TO DELIVER A CONSISTENT TIDAL VOLUME (VT).
- DIFFERENT VENTILATORS HAVE DIFFERENT MODES OF VTV.
- DEPENDING ON VENTILATOR AND MODE SELECTED IT ADJUSTS ONE OR MORE OF PIP, INFLATION TIME, AND INFLATION FLOW.
- THE CLINICIAN SETS A TARGET VT.
- DIFFERENT VENTILATORS SET EITHER VTI, VTE, OR BOTH, TO CONTROL VT DELIVERY.
- EXPIRED VT IS LESS AFFECTED BY ETT LEAKS
- MEASURING VTI AND VTE ENABLES ETT LEAK TO BE QUANTIFIED.



TO AVOID TIDAL VOLUME DAMAGE, VENTILATOR MUST ADAPT RAPIDLY TO CHANGING RESPIRATORY PARAMETERS

- BABY BREATHING IN SYNCHRONY OR OUT OF SYNCHRONY WITH INFLATIONS
- BABY CRYING
- BABY SPLINTING ABDOMEN OR DIAPHRAGM TO OBSTRUCT INFLATIONS
- APNEA
- COMPLIANCE AND RESISTANCE
- SURFACTANT TREATMENT
- ETT LEAK



TYPES OF VENTILATORS THAT DELIVER

- PRESSURE-REGULATED VOLUME CONTROL (PRVC)
 - SERVO 300 AND SERVO-I (MAQUET CRITICAL CARE, BRIDGEWATER, NJ)
 - EACH BREATH STARTS AS A PRESSURE-LIMITED BREATH, BUT IF THE SET V_T IS NOT REACHED, THE BREATH CONVERTS TO FLOW CYCLED MODE BY PROLONGING INSPIRATORY TIME WITH A PASSIVE INCREASE IN PIP.
- VOLUME ASSURED PRESSURE SUPPORT (VAPS)
 - BIRD VIP GOLD (VIASYS HEALTHCARE, PALM SPRINGS, CA)
 - EACH BREATH STARTS AS A PRESSURE-LIMITED BREATH, BUT IF THE SET V_T IS NOT REACHED, THE BREATH CONVERTS TO FLOW CYCLED MODE BY PROLONGING INSPIRATORY TIME WITH A PASSIVE INCREASE IN PIP.
- VOLUME GUARANTEE (VG)
 - DRAEGER BABYLOG (DRAEGER, INC., LUBECK, GERMANY)
 - REGULATES INSPIRATORY PRESSURE USING EXHALED V_T MEASUREMENT TO MINIMIZE ARTIFACT DUE TO ETT LEAK.



PRESSURE-REGULATED VOLUME CONTROL (PRVC) AVAILABLE ON THE SERVO 300 AND SERVO-I (MAQUET CRITICAL CARE, BRIDGEWATER, NJ)

- PRESSURE-REGULATED VOLUME CONTROL (PRVC)
- PRESSURE-LIMITED TIME-CYCLED MODE THAT ADJUSTS INSPIRATORY PRESSURE TO TARGET A SET VT, BASED ON COMPLIANCE CALCULATION FROM THE PRESSURE PLATEAU OF AN INITIAL VOLUME-CONTROLLED BREATH.
- THE BREATH-TO-BREATH CHANGE IN PEAK INSPIRATORY PRESSURE (PIP) IS LIMITED TO 3 CMH₂O TO AVOID OVERSHOOT.
- THE MAIN PROBLEM WITH THE PRVC MODE
 - INACCURACY OF VT MEASUREMENT PERFORMED AT THE VENTILATOR END OF THE CIRCUIT, RATHER THAN AT THE AIRWAY OPENING.
 - INSPIRATORY VT IS USED TO ADJUST PIP, MAKING THE DEVICE SUSCEPTIBLE TO LARGE ERROR IN THE PRESENCE OF SIGNIFICANT ENDOTRACHEAL TUBE (ETT) LEAK.
 - LOSS OF VOLUME IN THE CIRCUIT, BUT THE ACCURACY REMAINS INSUFFICIENT FOR USE IN SMALL NEONATES.



VOLUME ASSURED PRESSURE SUPPORT (VAPS) MODE ON THE BIRD VIP GOLD (VIASYS HEALTHCARE, PALM SPRINGS, CA)

- THE VOLUME ASSURED PRESSURE SUPPORT (VAPS)
- HYBRID MODE, EACH BREATH STARTS AS A PRESSURE-LIMITED BREATH, BUT IF THE SET VT IS NOT REACHED, THE BREATH CONVERTS TO FLOW CYCLED MODE BY PROLONGING INSPIRATORY TIME WITH A PASSIVE INCREASE IN PIP.
- PROBLEMS WITH THIS MODE
 - PROLONGED INSPIRATORY TIME LEADING TO EXPIRATORY ASYNCHRONY.
 - TARGETING OF TIDAL VOLUME IS ALSO BASED ON INSPIRATORY VT AND THEREFORE IS SUSCEPTIBLE TO ERROR IN THE PRESENCE OF SIGNIFICANT ETT LEAK.
 - NO PROVISION FOR AUTOMATICALLY LOWERING INSPIRATORY PRESSURE AS LUNG COMPLIANCE IMPROVES.
 - THE FOCUS IS ON ENSURING A LARGE ENOUGH VT, BUT NO PROVISION IS MADE TO AVOID INADVERTENT HYPERVENTILATION AND ALLOW FOR AUTOMATIC WEANING.
- THE NEW AVEA VENTILATOR BY VIASYS SHARES THE BASIC FEATURES OF VAPS BUT ADDS A **VOLUME LIMIT FUNCTION** THAT WILL TERMINATE INSPIRATION IF THE UPPER LIMIT OF VT IS EXCEEDED.
- SHOULD REDUCE THE RISK OF VOLUTRAUMA AND HYPERVENTILATION, BUT STILL DOES NOT LEAD TO AUTOMATIC WEANING OF INSPIRATORY PRESSURE.

DRAEGER BABYLOG (DRAEGER, INC., LUBECK, GERMANY) VOLUME GUARANTEE (VG)

- VOLUME GUARANTEE (VG) OPTION REGULATES INSPIRATORY PRESSURE USING EXHALED VT MEASUREMENT TO MINIMIZE ARTIFACT DUE TO ETT LEAK.
- THE OPERATOR CHOOSES A TARGET VT AND SELECTS A PRESSURE LIMIT UP TO WHICH THE VENTILATOR OPERATING PRESSURE (THE WORKING PRESSURE) MAY BE ADJUSTED.
- THE MICROPROCESSOR COMPARES THE VT OF THE PREVIOUS BREATH AND ADJUSTS THE WORKING PRESSURE TO ACHIEVE THE SET VT.
- THE ALGORITHM LIMITS THE AMOUNT OF PRESSURE INCREASE FROM ONE BREATH TO THE NEXT, IN ORDER TO AVOID OVERCORRECTION LEADING TO EXCESSIVE VT.
- PROBLEMS WITH THIS MODE
 - THE FACT THAT THE EXHALED VT OF THE PRIOR BREATH IS USED, MEANS THAT WITH RAPID CHANGES IN COMPLIANCE OR PATIENT INSPIRATORY EFFORT, SEVERAL BREATHS MAY BE NEEDED TO REACH TARGET VT.
 - THE ALGORITHM IS GEARED TOWARD SLOWER ADJUSTMENT FOR LOW VT AND MORE RAPID ADJUSTMENT FOR EXCESSIVE, POTENTIALLY DANGEROUS VT.
- THE AUTOMATIC REDUCTION OF INSPIRATORY PRESSURE IN RESPONSE TO IMPROVING LUNG COMPLIANCE AND INCREASED PATIENT EFFORT MAKES VG A SELF-WEANING MODE.
- POTENTIAL TO ACHIEVE FASTER WEANING FROM MECHANICAL VENTILATION.

Volume-targeted versus pressure-limited ventilation in the neonate

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A COMPARISON OF VOLUME-TARGETED VENTILATION MODES WITH TRADITIONAL PRESSURE-LIMITED VENTILATION MODES FOR NEWBORN BABIES

- REVIEW QUESTION: DOES VENTILATOR THERAPY OF INFANTS USING A STRATEGY TARGETING INFLATION VOLUME RATHER THAN INFLATION PRESSURE LEAD TO LOWER RATES OF DEATH OR LUNG DAMAGE (OR BOTH) AMONG THESE INFANTS?
- KEY RESULTS: BABIES VENTILATED USING VOLUME-TARGETED MODES OF VENTILATION WERE MORE LIKELY TO SURVIVE FREE OF LUNG DAMAGE.
- THEY NEEDED VENTILATOR ASSISTANCE FOR A SHORTER DURATION AND WERE LESS LIKELY TO DEVELOP PNEUMOTHORAX (A CONDITION WHEN AIR ESCAPES FROM THE LUNG INTO THE CHEST).
- THEY HAD MORE STABLE CARBON DIOXIDE LEVELS IN THE BLOOD AND HAD FEWER BRAIN ULTRASOUND ABNORMALITIES.
- THERE WAS NO EVIDENCE THAT VOLUME-TARGETED MODES WERE MORE LIKELY TO HARM THE INFANT THAN TRADITIONAL PRESSURE-LIMITED MODES.
- MORE RESEARCH IS NEEDED TO UNDERSTAND WHETHER VOLUME-TARGETED MODES ALSO LEAD TO IMPROVEMENTS IN THE DEVELOPMENT OF MOVEMENT AND INTELLECT.
- MORE RESEARCH IS ALSO NEEDED COMPARING DIFFERENT VOLUME-TARGETING TECHNIQUES.



The background of the slide is a light gray gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance. The text is centered in the middle of the slide.


STUDIES THAT SUPPORT VOLUME GUARANTEE VENTILATION



Systematic Review and Meta-Analysis

Volume-Targeted versus Pressure-Limited Ventilation for Preterm Infants: A Systematic Review and Meta-Analysis

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 [Summary text](#)



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- **PUBLISHED:** COCHRANE REVIEW FROM OCTOBER 2017
- **AUTHORS:** KLINGENBERG C, WHEELER KI, MCCALLION N, MORLEY CJ, DAVIS PG

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- MORE RESEARCH IS ALSO NEEDED COMPARING DIFFERENT VOLUME-TARGETING TECHNIQUES.

CONCLUSION

- THE USE OF VTV IS ASSOCIATED WITH IMPORTANT CLINICAL BENEFITS:
- REDUCTIONS IN THE COMBINED OUTCOMES OF DEATH/ BPD, INCIDENCE OF HYPOCARBIA, PNEUMOTHORAX, DURATION OF VENTILATION, AND THE COMBINED OUTCOME OF PVL/SEVERE IVH.
- VTV WAS NOT ASSOCIATED WITH ANY INCREASE IN ADVERSE OUTCOMES.
- FURTHER RESEARCH AND DEVELOPMENT IS NEEDED TO REFINE AND COMPARE VTV MODES AND CLINICAL STRATEGIES.
- INSUFFICIENT INFANTS HAVE BEEN FOLLOWED UP TO ASSESS NEURODEVELOPMENTAL OUTCOMES, AND MORE FOLLOW-UP DATA WOULD PROVIDE IMPORTANT INFORMATION ABOUT THE SAFETY AND EFFICACY OF VTV.

Review

Volume-targeted ventilation is more suitable than pressure-limited ventilation for preterm infants: a systematic review and meta-analysis

FREE

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VOLUME-TARGETED VENTILATION IS MORE SUITABLE THAN PRESSURE-LIMITED VENTILATION FOR PRETERM INFANTS: A SYSTEMATIC REVIEW AND META-ANALYSIS

- **OBJECTIVE** TO ASSESS THE EFFECT OF VOLUME-TARGETED VENTILATION (VTV) COMPARED WITH PRESSURE-LIMITED VENTILATION (PLV) IN PRETERM INFANTS.
- **METHOD** WE SEARCHED THE COCHRANE LIBRARY (ISSUE 3, 2013), PUBMED (1966 TO 5 MARCH 2013), CHINA NATIONAL KNOWLEDGE INFRASTRUCTURE (CNKI) AND PERIODICAL DATABASES (1979 TO 5 MARCH 2013).
- WE SELECTED RANDOMISED CONTROLLED TRIALS (RCTS) AND QUASI-RCTS OF VTV VERSUS PLV AS ACTIVE INTERVENTIONS IN PRETERM INFANTS.
- WE PERFORMED META-ANALYSES USING THE COCHRANE STATISTICAL PACKAGE REVMAN 5.0.



CONCLUSION

- PRETERM INFANTS VENTILATED USING VTV MODES HAD REDUCED:
 - DURATION OF MECHANICAL VENTILATION
 - INCIDENCE OF BPD
 - FAILURE OF PRIMARY MODE OF VENTILATION
 - HYPOCARBIA
 - GRADE 3/4 IVH
 - PNEUMOTHORAX
- THERE WAS NO EVIDENCE THAT INFANTS VENTILATED WITH VTV MODES HAD REDUCED DEATH COMPARED TO INFANTS VENTILATED USING PLV MODES.



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Volume guarantee ventilation in neonates treated with hypothermia for hypoxic-ischemic encephalopathy during interhospital transport

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VOLUME GUARANTEE VENTILATION IN NEONATES TREATED WITH HYPOTHERMIA FOR HYPOXIC-ISCHEMIC ENCEPHALOPATHY DURING INTERHOSPITAL TRANSPORT

- OBJECTIVE

- WE INVESTIGATED IF VOLUME GUARANTEE (VG) VENTILATION IN BABIES WITH HYPOXIC-ISCHEMIC ENCEPHALOPATHY (HIE) DURING INTERHOSPITAL TRANSPORT DECREASES TIDAL VOLUMES AND PREVENTS HYPOCAPNIA.

- RESULTS

- THE EXPIRATORY TIDAL VOLUME OF VENTILATOR INFLATIONS WAS LOWER WITH SIMV-VG (MEDIAN [IQR]: 4.9 [4.6–5.3] ML/KG) THAN WITH SIMV ONLY (MEDIAN [IQR]: 7.1 [5.3–8.0] ML/KG, $P = 0.01$). BABIES RECEIVING SIMV-VG HAD LOWER PEAK INFLATING PRESSURES (MEDIAN: 10.7 CMH₂O, VERSUS 17.5 CMH₂O, $P = 0.01$).



CONCLUSIONS

- THE USE OF VG VENTILATION IN BABIES WITH HIE REDUCES TIDAL VOLUMES AND FREQUENTLY RESULTS IN VERY LOW INFLATING PRESSURES WITHOUT AFFECTING PCO_2 .

Effects of Volume Guaranteed Ventilation Combined with Two Different Modes in Preterm Infants

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Respiratory Care December 2017, 62 (12) 1525-1532; DOI: <https://doi.org/10.4187/respcare.05513>



EFFECTS OF VOLUME GUARANTEED VENTILATION COMBINED WITH TWO DIFFERENT MODES IN PRETERM INFANTS

- **METHODS:** PRETERM INFANTS WHO WERE BORN IN OUR HOSPITAL BETWEEN 24-32 WEEKS GESTATION AND NEEDED MECHANICAL VENTILATION FOR RESPIRATORY DISTRESS SYNDROME WERE CONSIDERED ELIGIBLE. PATIENTS REQUIRING HIGH-FREQUENCY OSCILLATORY VENTILATION FOR PRIMARY TREATMENT WERE EXCLUDED. SUBJECTS WERE RANDOMIZED TO EITHER SIMV+VG OR PSV+VG. CONTINUOUSLY RECORDED VENTILATORY PARAMETERS, CLINICAL DATA, BLOOD GAS VALUES, AND TRACHEAL ASPIRATE CYTOKINE LEVELS WERE ANALYZED.
- **RESULTS:** THE STUDY ENROLLED 42 SUBJECTS. CLINICAL DATA WERE SIMILAR BETWEEN GROUPS. PSV+VG DELIVERED CLOSER TIDAL VOLUMES TO SET TIDAL VOLUMES (60% VS 49%, $P = .02$). CLINICAL DATA, INCLUDING DAYS ON VENTILATION, MORBIDITY, AND MORTALITY, WERE SIMILAR BETWEEN GROUPS. CHRONIC LUNG DISEASE OCCURRED LESS OFTEN AND HEART RATE WAS LOWER IN SUBJECTS WHO WERE VENTILATED WITH PSV+VG. THE INCIDENCE OF HYPOCARBIA AND HYPERCARBIA WERE SIMILAR. INTERLEUKIN-1B IN THE TRACHEAL ASPIRATES INCREASED DURING BOTH MODES.

CONCLUSION

- PSV+VG PROVIDED CLOSER TIDAL VOLUMES TO THE SET VALUE IN VENTILATED PRETERM INFANTS WITH RESPIRATORY DISTRESS SYNDROME AND WAS NOT ASSOCIATED WITH OVERVENTILATION OR A DIFFERENCE IN MORTALITY OR MORBIDITY WHEN COMPARED TO SIMV+VG. THEREFORE, PSV+VG IS A SAFE MODE OF MECHANICAL VENTILATION TO BE USED FOR RESPIRATORY DISTRESS SYNDROME.

SUMMARY

- CONTROLLING TIDAL VOLUMES IS VERY IMPORTANT IN NEONATES
- VOLUME TARGETED VENTILATION STRATEGIES HAVE BEEN SHOWN TO BE VERY PROMISING
- VOLUME-CONTROLLED VENTILATION MODES HAVE BEEN SHOWN TO REDUCE DURATION OF MECHANICAL VENTILATION, INCIDENCE OF CHRONIC LUNG DISEASE, FAILURE OF PRIMARY MODE OF VENTILATION, HYPOCARBIA, SEVERE INTRAVENTRICULAR HEMORRHAGE, PNEUMOTHORAX, AND PERIVENTRICULAR LEUKOMALACIA IN PRETERM INFANTS WHEN COMPARED WITH PRESSURE LIMITED VENTILATION MODES.
- NEW MODES COMBINE VOLUME GUARANTEE VENTILATION WITH HFOV (NEW TOPIC)
 - **IMPACT OF VOLUME GUARANTEE ON HIGH-FREQUENCY OSCILLATORY VENTILATION IN PRETERM INFANTS: A RANDOMIZED CROSSOVER CLINICAL TRIAL**



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