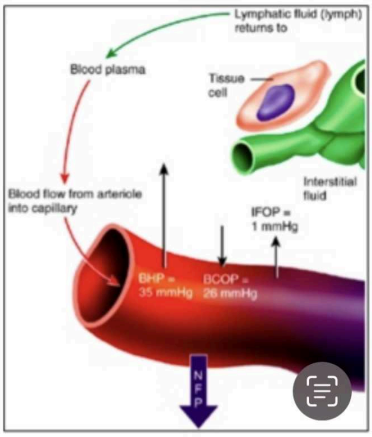
OB AIRWAY CONSIDERATIONS

- Obstetric emergencies requiring airway securement can be completely unanticipated and unpredictable, and every patient's airway must be vigilantly optimized and considered for potential intubation in case of emergency.
    - [ex: AFE, PE, total spinal, MTP, etc…]
- Normal physiologic changes of pregnancy can cause increased swelling/third spacing in all parturients:
    - Decreased IV colloid oncotic pressure $^2/_2$: dilutional hypoalbuminemia & increased TBW $^2/_2$ increased ADH secretion and decreased thirst threshold. In addition, RAAS system activation increases fluid retention.
        - Decreases space in oropharynx, can create smaller glottic aperture
    - Mucosal vascular engorgement → increased tissue friability and risk of airway bleeding.
    - **LABOR** can increase airway swelling in all parturients $^2/_2$ fluid retention and shifts.
    - **PUSHING**** especially increases swelling as parturients Valsalva for hours against a closed glottis.
- After instrumentation/failed intubation, these friable airway tissues can swell *rapidly* and significantly, will continue to worsen with multiple instrumentation attempts, and are more prone to bleeding.
    - Careful with **OGT** insertion – insert as gently as possible to minimize pharyngeal/glottic trauma.
    - Glidescope provides a more gentle intubation for friable tissues, requiring less pressure on oropharyngeal tissues for mandibular displacement.
- *Additional considerations:* weight gain and increased breast size can decrease available space around mandible to insert laryngoscope blade, while LUD can also impair optimal airway positioning.
    - **Ramping** appropriate pts to ensure better success in both BVM and airway instrumentation, in case of anticipated or unanticipated intubation. Treat labor pts as known difficult airways and take appropriate positioning measures before drapes go up and everyone is sterile.
    - Blankets to ramp with are available in the warmer in every OR.

Starling Forces and Fluid Exchange

- **Outward forces:**
  - Blood hydrostatic pressure (BHP)= 35 mmHg
  - Interstitial fluid colloidal osmotic pressure (IFOP)= 1 mmHg
- **Inward forces:**
  - Blood colloidal osmotic pressure (BCOP)= 26 mmHg
  - interstitial fluid hydrostatic pressure (IFHP)= 0 mmHg

Key:
BHP = Blood hydrostatic pressure
IFHP = Interstitial fluid hydrostatic pressure
BCOP = Blood colloid osmotic pressure
IFOP = Interstitial fluid osmotic pressure
NFP = Net filtration pressure



Normal Airway Changes During Labor & Delivery

Anesthesiology. 2008;108(3):357-362. doi:10.1097/ALN.0b013e31816452d3

PRE-LABOR:

[SAME PATIENT]

POST-LABOR:

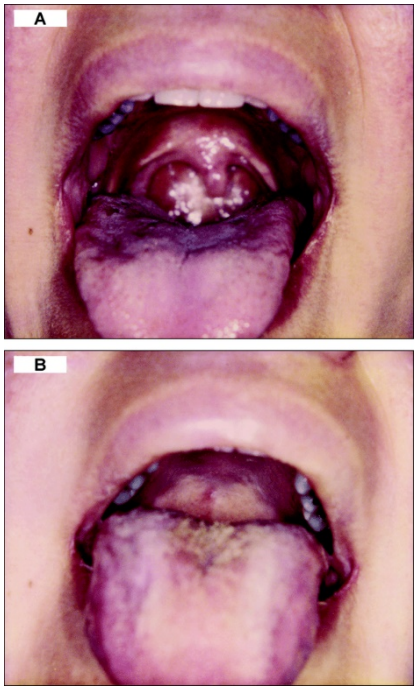


Figure Legend:
Fig. 2. Airway pics pre-labor (Samsoon modification of MP class 1 airway; A) and post-labor (Samsoon modification of MP class 3 airway; B).

PRE-E & HELLP AIRWAYS

- **PreE/HELLP:** Fundamentally a disease of microvascular endothelial damage $^{2}/_{2}$ inflammatory mediators released from hypo-perfused placenta. This endothelial damage directly causes sequelae of severe features (HTN, cerebral edema, peripheral edema, pulmonary edema, liver dysfunction, renal dysfunction, and thrombocytopenia.) Increased swelling and third spacing is caused by:
    - **HTN** (increased hydrostatic pressure) $^{2}/_{2}$ impaired relaxin-mediated N.O. production in damaged endothelium, and increased sensitivity to potent vasoconstrictor angiotensin 2.
    - **Capillary leak** as plasma proteins can leak out into extravascular space through damaged endothelium: decreasing IV oncotic pressure, while increasing interstitial oncotic/pulling pressure out of vascular compartment.
- These pts are prone to *excessive* swelling and edema [not only in airway, but peripheral, cerebral, & pulmonary edema are all severe features of PreE, all $^{2}/_{2}$ endothelial damage and dysfunction.]
- **Now add increased swelling of labor, and ++ increased swelling of pushing:**
    - (ex: PreE 10cm/100%/+1 – has been pushing 3+hrs and cannot deliver baby- plan for c/s.
        - New prolonged decel requires STAT case and epidural fails → GA
        - Epidural iffy and starts failing early on during case → GA
        - Consider: Pt has been in labor and pushing – all parturients will likely have increased airway swelling at this point.
            - Now add: PreE endothelial dysfunction exacerbating swelling, as well as increasing risk of bleeding in extra friable, swollen airway tissues.

OB Airway Risks:
"Pushing, Pressure, Boobs & Braids"

- **PUSHING:** Pushing in labor can significantly increase airway swelling, regardless of BMI or other comorbidities.
    - Consider in c/s after pt has been pushing - position airway appropriately.
- **PRESSURE:** **HTN** d/o of pregnancy: PreE/HELLP pts (esp after pushing) can have severe airway swelling $^{2}/_{2}$ third spacing, while also being more prone to bleeding with instrumentation from endothelial inflammation and injury consuming PLTs and clotting factors
- **BOOBS:** Engorged breast tissue and weight gain of pregnancy can: impede mandibular opening, decrease space around mandible for laryngoscope blade insertion, and can also impede neck access in emergency surgical airway in ***Cannot Intubate, Cannot Ventilate*** situation.
    - Ramping displaces breast tissue down & away from neck, improves glottic view & ability to BVM.
- **BRAIDS:** Fixed braided hair/bun may not allow neck extension for intubation and airway management.
    - Figure out how to allow full neck extension prior to start of case

OB AIRWAY EXTUBATION

- ✓ Extubate awake and following commands, good leak test, and not over-narcotized.
- ✓ Extubate AFTER post-op vaginal exam and uterine clot expression – very stimulating – can laryngospasm.
- ✓ Airway swelling from intubation/instrumentation can cause airway obstruction **post-op**, and L&D PACU RNs are NOT accustomed to managing airway emergencies.
- ✓ Parturients CANNOT leave the OR until they have a stable, patent airway, and are suitable for L&D PACU, as post-op OB airway complications can cause *rapid respiratory decompensation*.
- ✓ If extubation is deemed unsafe, it is appropriate to send pt to ICU until airway swelling/trauma resolves, and pt can be safely extubated.

Final Note:

OB airways can be high-risk, but DO NOT PANIC. Pre-oxygenate your pt, position your pt, and take the extra few seconds to prepare her airway as best you can. Failure to optimize the airway can contribute to difficult intubations, and rapid hypoxia from a failed airway can cause more fetal & maternal harm than taking the extra minute to optimize the airway and set the intubation up for success. And remember to be gentle with your intubation technique and instrumentation, minimizing trauma to airway tissues.

** Consider every. single. woman's airway may need intubation, and think through the safest plan for every single patient. This way, you will never be caught by surprise.