Direct Peritoneal Resuscitation

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Background

- It was identified that continuous peritoneal lavage for abdominal contamination and peritoneal dialysis improved intraperitoneal microcirculation. DPR came about as a result of these findings.
- The belief was that it could be beneficial in abdominal trauma patients requiring Damage Control Laparotomy to augment IV and macrocirculation resuscitation by focusing on improving splanchnic microcirculation
- Animal Studies in 2004
- Human Studies in 2010

Benefits of DPR

- Initiation at first OR visit is suggested
  - Data showed that delayed initiation prolonged abdominal closure significantly
- Hypertonicity of the solution triggers visceral vasodilation to help maintain and increase blood flow
- Reduce hypoperfusion during shock state
- Associated with reduced local inflammatory cytokines and other mediators
- Preservation of endothelial cell function, and mitigation of organ edema and necrosis
- Has a direct effect on liver perfusion and decreases bowel edema
- More rapidly corrects electrolyte abnormalities compared to intravenous resuscitation alone
- May require less intravenous fluid to stabilize blood pressure
- Shortens the time required to close patients' abdomen.
- Decreased LOS in ICU
- Decreased number of surgeries
- Decreased complications
- Increased Survival Rates

Indications

- Patients with hemorrhagic shock that have undergone Damage Control Laparotomy with open abdomen
- Any trauma patient requiring open abdomen to mitigate abdominal compartment syndrome
- Early bowel edema
- Massive contamination
- Concern for early loss of domain

Supplies

- 2.5 % Dextrose Peritoneal Dialysis Solution
- Wall suction set up
- IV Pump with tubing (pre-connected to dialysate)
- BD Catheter Connector to connect IV tubing to JP drain
- Dressing Supplies-wound vac
- Scissors/Trauma Shears
- Lopez Valve

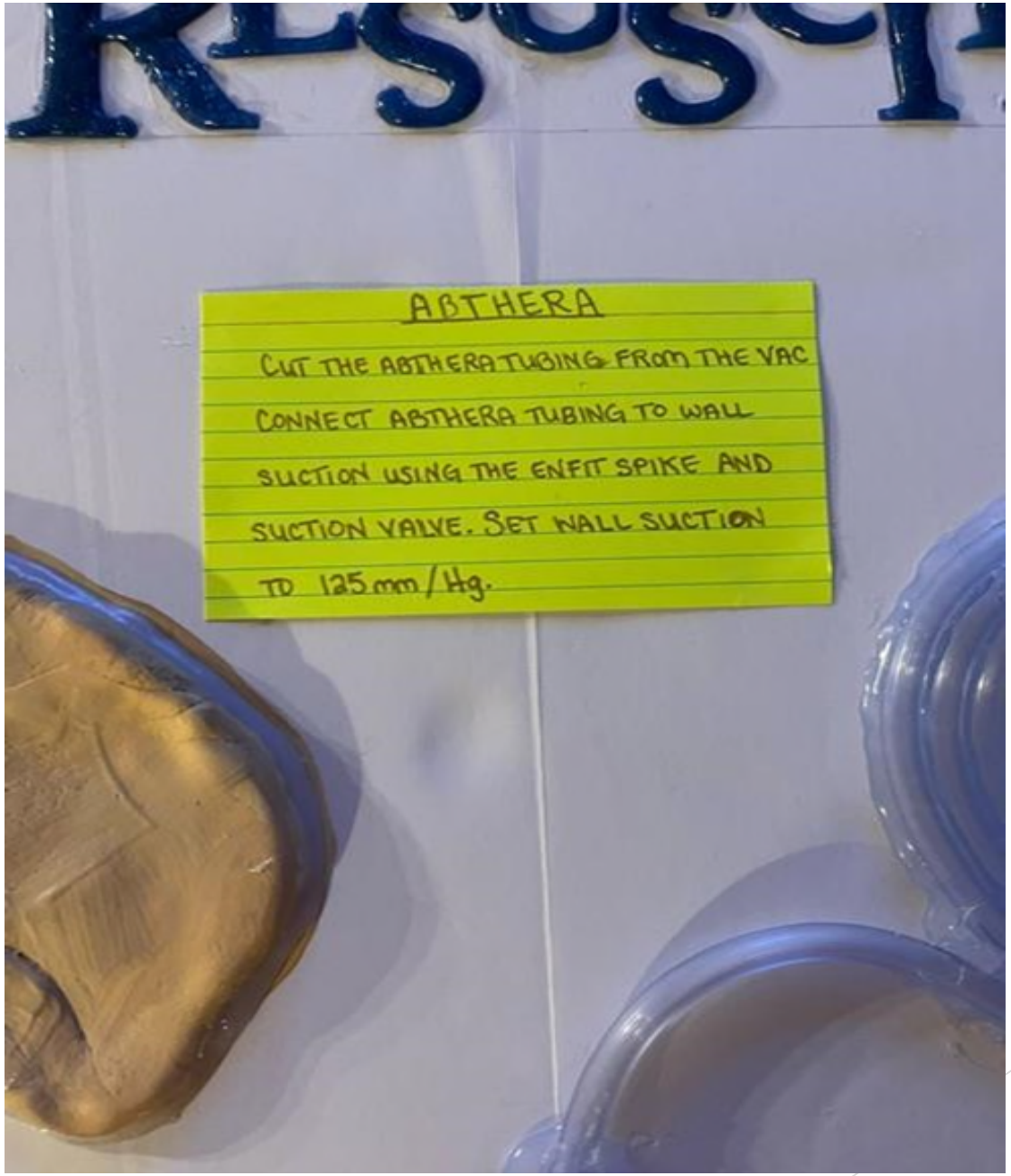
Process

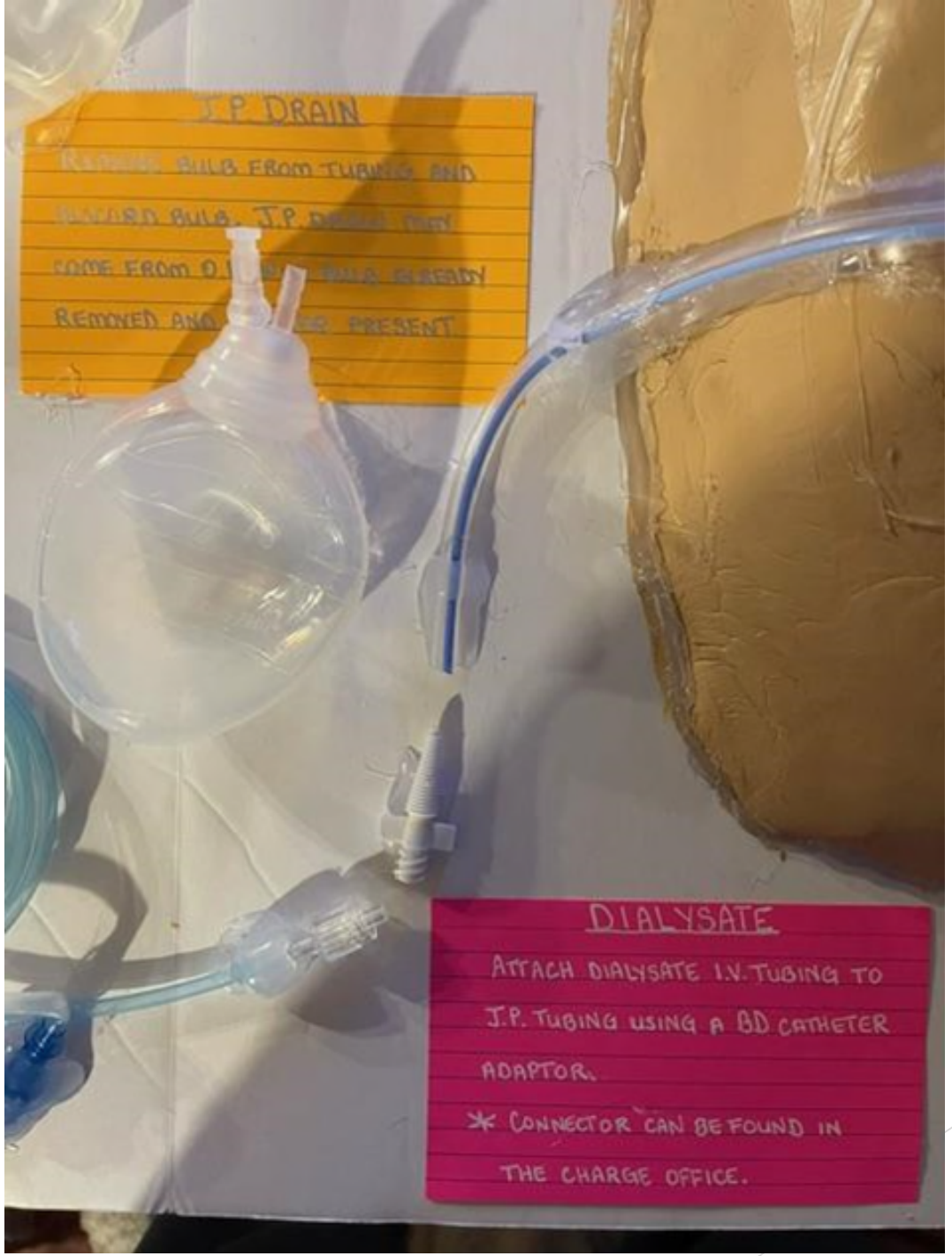
- The patient comes to the ICU from OR with negative pressure wound dressing in the midline and a JP drain in place
- The ICU nurse removes the bulb from the JP drain if not already done in OR
- The IV tubing is connected to the JP Drain using the BD connector
- The wound vac tubing is connected to wall suction by cutting tubing and using Lopez valve connector and suction valve. (suction is set to 125 mm/hg)
  - Some places use two 28F chest tubes for better distribution of fluid and use lower wall suction
- Initial 500-800ml Bolus –This varies by facility…some do the bolus and so don't
- Set Rate of 400ml/hr of continuous infusion of dialysate

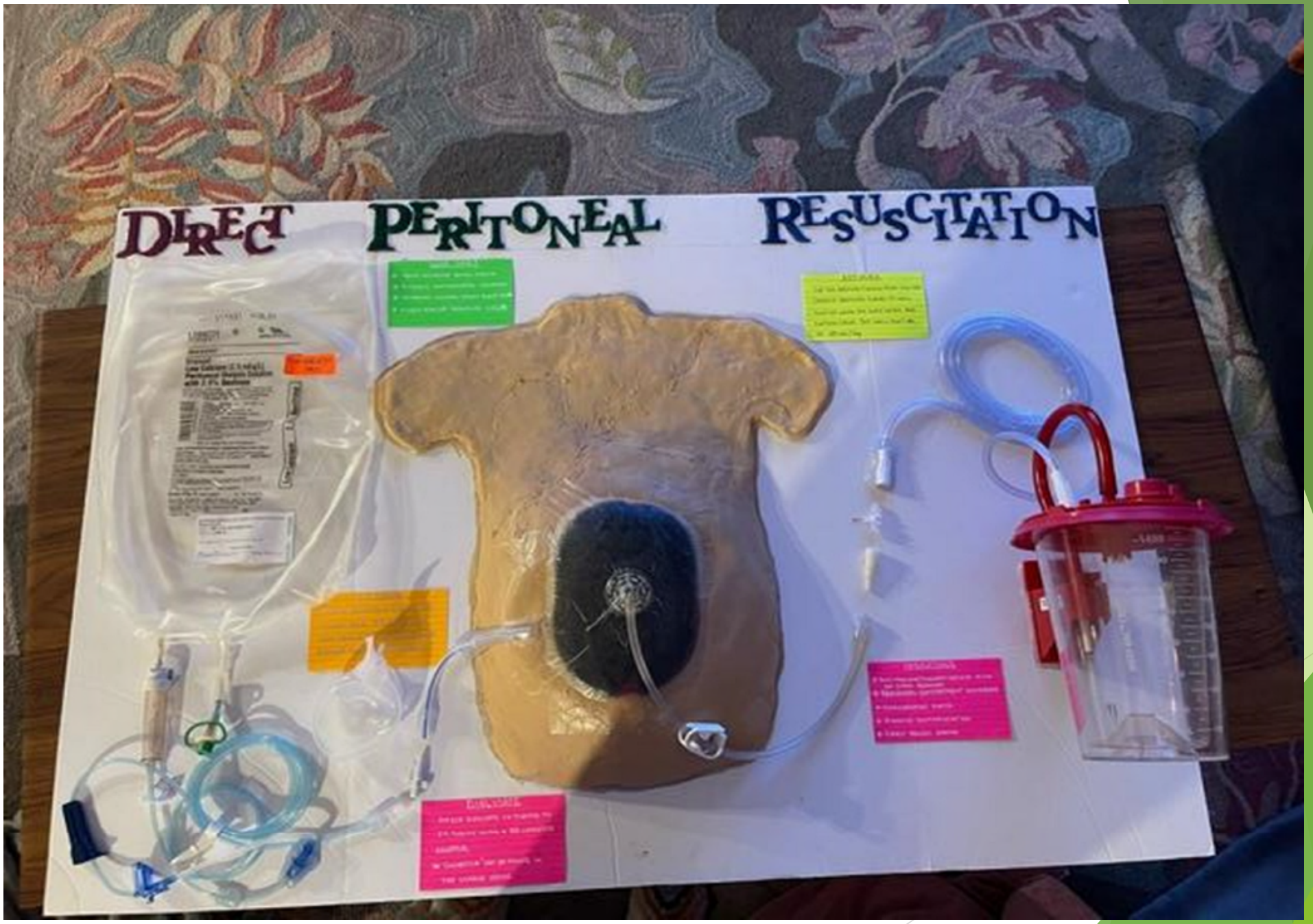
Nursing Considerations

- Monitor Intake/Outake Q 1 hour to ensure all dialysate is being removed
  - Document Intake from pump Q 1 hour then clear pump
  - Notify physician if output less than 400 mls/hr for 2 consecutive hours – theoretically this can cause abdominal compartment syndrome
- Scheduled labs to monitor Electrolytes –physician discretion
- Close monitoring of patients vital signs, drains, and dressings
- Notify Physician and Wound Nurse if any issues with wound vac and IMMEDIATELY stop infusion
- Notify Physician for new onset frank bloody drainage
- Sudden increase or change in character or level in pain
- Discrepancies in Intake from infusion and Output from VAC
- Increased Abdominal Distension from baseline


PERITON
WHY DPR?
* HELPS DECREASE BOWEL EDEMA
* REDUCES INFLAMMATORY CYTOKINES
* IMPROVES VISCERAL ORGAN BLOOD FLOW
* ALLOWS EARLIER ABDOMINAL CLOSURE


ABTHERA
CUT THE ABTHERA TUBING FROM THE VAC
CONNECT ABTHERA TUBING TO WALL
SUCTION USING THE ENFIT SPIKE AND
SUCTION VALVE. SET WALL SUCTION
TO 125 mm/Hg.


J.P DRAIN
BULB FROM TUBING AND
BULB. J.P
FROM
BULB ALREADY
REMOVED AND
PRESENT
DIALYSATE
ATTACH DIALYSATE I.V. TUBING TO
J.P. TUBING USING A BD CATHETER
ADAPTOR.
* CONNECTOR CAN BE FOUND IN
THE CHARGE OFFICE.


DIRECT PERITONEAL RESUSCITATION

Emerging Trends

- DPR in Organ Donation
  - As brain death occurs it initiates a systemic inflammatory state which leads to capillary endothelial damage causing pulmonary capillary leakage and lung edema
  - Studies are showing that DPR reduces pulmonary edema and multiple inflammatory mediators and cytokines improving lung function after brain death allowing for higher transplantation rates
  - These studies are also showing that DPR subjects
    - Required less crystalloids in the first 12 hours of resuscitation
    - Were less likely to require vasopressors at 12 hours after resuscitation
    - Had better hepatic blood flow
    - Generally had higher organ transplantation rates

References

- Eastern Association for Surgery in Trauma Direct Peritoneal Resuscitation Procedure Guideline - https://www.east.org/content/documents/112_dpr.pdf
- Weaver, J.L. et al. (2020) Direct Peritoneal Resuscitation Reduces Lung Injury and Caspase 8 Activity in Brain Death. *Journal of Investigative Surgery,* 33: 803-812.
- Ribeiro-Junior, M.A.F. et al. (2022). The Role of Direct Peritoneal Resuscitation in the Treatment of Hemorrhagic Shock After Trauma and in Emergency Acute Care Surgery: a Systematic Review. *European Journal of Trauma and Emergency Surgery,* 48:791–797.
- Grant Medical Center – OhioHealth Trauma Services, Columbus, Ohio
  - ACS verified Adult Level 1 Trauma Center
  - REBOA/pREBOA-PRO Center of Excellence