


Disseminated Intravascular Coagulation

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ADVANCED ORGANIZER

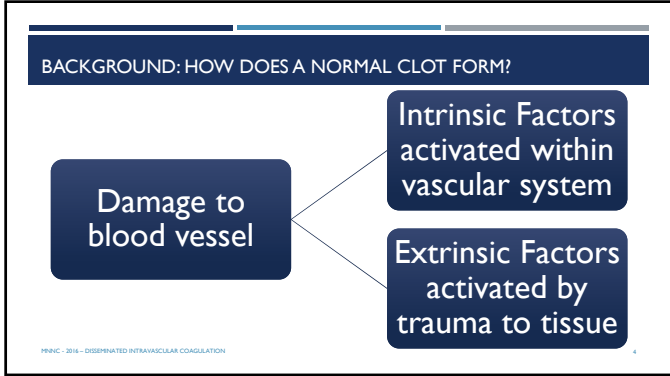
- Background
- Causes
- Assessment
- Treatment

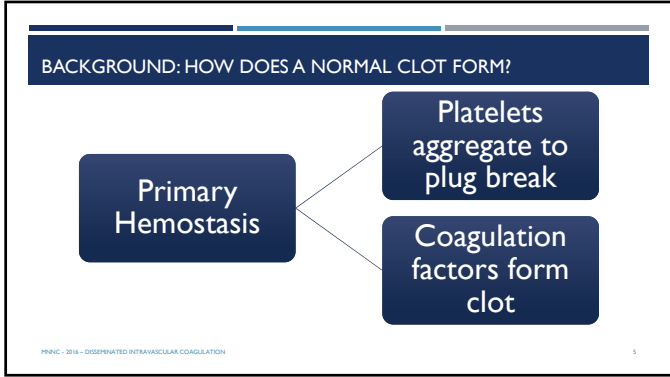
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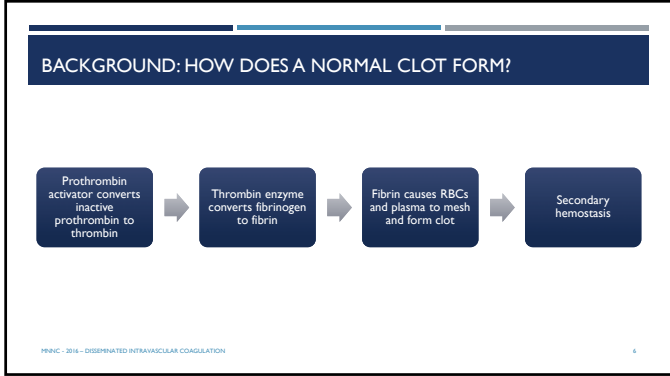
DISSEMINATED INTRAVASCULAR COAGULATION

Part I: Background







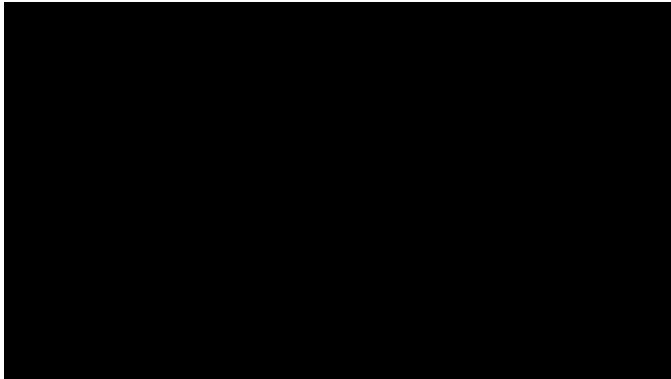


BACKGROUND: HOW DOES A NORMAL CLOT BREAK DOWN?

- Primary fibrinolysis is normal and necessary to allow normal circulation to be re-established
- Localized process (at site of injury)
- Requires consumption of coagulation factors

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graph LR; A[Plasminogen activator converts plasminogen to plasmin which breaks down fibrin] --> B[Thrombin, plasmin, and coag factors are neutralized or consumed]; B --> C[Normal circulation restored];
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BACKGROUND: HOW DOES CLOTTING DIFFER IN PREGNANCY?


Changes in the coagulation and fibrinolytic systems are normal in pregnancy

- Pregnancy is a "hypercoagulable state"
 - Prothrombin, Fibrinogen, and factors V, VII, VIII, IX, X, and XII increase (promoting coagulation)
 - Factors IX and XIII and Protein S and Activated Protein C decrease (inhibiting portion of coag cascade)
 - Fibrinolysis is inhibited
- This happens to...
 - Maintain the pregnancy
 - Minimize risk of blood loss at delivery

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Part II: Causes

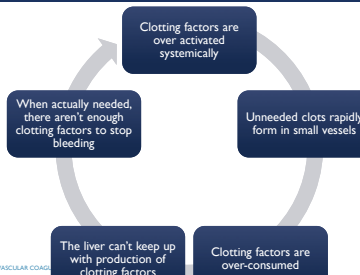


CAUSES: HOW DO WE GET INTO TROUBLE?

Disseminated Intravascular Coagulation (DIC) literally means:
"blood clots scattered throughout the vascular system"

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CAUSES: HOW DO WE GET INTO TROUBLE?



Clotting factors are over activated systemically

Unneeded clots rapidly form in small vessels

Clotting factors are over-consumed


The liver can't keep up with production of clotting factors

When actually needed, there aren't enough clotting factors to stop bleeding

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CAUSES: DIC IN GENERAL POPULATION

- Trauma
- Hemolytic conditions
- Sepsis
- Transfusion reactions
- Malignant hypertension
- Carcinoma
- Snake bites



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CAUSES: DIC IN THE OBSTETRIC PATIENT

- Placental abruption
- Amniotic fluid embolism
- Severe preeclampsia, eclampsia, and HELLP
- Intrauterine fetal demise (IUFD)
- Massive hemorrhage

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CAUSES: PLACENTAL ABRUPTION

Placental Abruption is the MOST common cause of DIC in the obstetric patient

- Some of the products of the clot that forms at the site may enter maternal circulation via the uterine vessels
- This causes massive consumption of the clotting factors

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CAUSES: TYPES OF PLACENTAL ABRUPTION




Partial separation (concealed hemorrhage)
Along the placental membrane, there is a partial separation of normally implanted placenta.

Partial separation (apparent hemorrhage)
Along the placental membrane, there is a partial separation of normally implanted placenta.

Complete separation (concealed hemorrhage)
The placenta is completely separated from the uterine wall.

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CAUSES: AMNIOTIC FLUID EMBOLISM



Amniotic fluid normally contains vernix, squamous cells, mucous, and/or meconium

Amniotic fluid enters the maternal circulation


Causes pulmonary, cardiac, or cerebral emboli

Leads to severe arterial vasospasm

Signs & Symptoms: Respiratory distress, dyspnea, pulmonary edema, foamy pink saliva, seizures, fetal bradycardia, hypotension, cyanosis, cardiovascular collapse, coma, activation of the coag cascade

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CAUSES: SEVERE PREECLAMPSIA, ECLAMPSIA, AND HELLP



Severe hypertension causes endothelial damage

Triggers clotting and fibrinolytic process

Thrombocytopenia

DIC

Thrombocytopenia (decreased platelets) presents BEFORE DIC

- Watch platelet count

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CAUSES: IUFD

- Intrauterine Fetal Demise (IUFD) can lead to infection and bleeding
- Patients are at high risk for DIC particularly if fetus remains in utero for greater than 5 weeks
- Best course of action is induction of labor if does not occur spontaneously

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CAUSES: MASSIVE HEMORRHAGE


Profound hypovolemia → Decreased oxygenated blood to tissues → Activates clotting and fibrinolysis

Possible causes: postpartum hemorrhage, hematoma formation, placenta previa

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Part III: Assessment



ASSESSMENT: INITIAL SIGNS AND SYMPTOMS

- Bruising
- Oozing of blood from damaged blood vessels into the tissues
- Bleeding from the nose, gums, injections sites, catheter insertions sites, etc.
- Hematuria
- Signs of circulatory shock: cold, clammy, and pale, weak, tachycardia, tachypnea, hypotension, decreased urine output, restlessness and anxiety deteriorating into decreased LOC

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ASSESSMENT: LAB FINDINGS

- Platelets: $\downarrow < 100,000 \text{mm}^3$
- Fibrinogen: $\downarrow < 400 \text{mg/dL}$
- Fibrin degradation products: $\uparrow > 10 \text{mg/dL}$
- Prothrombin (PT) and Partial Thromboplastin Time (PTT): typically altered
 - **But it's really platelets and Fibrinogen that will determine severity of the disease**

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Part IV: Treatment



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TREATMENT: NURSING INTERVENTIONS

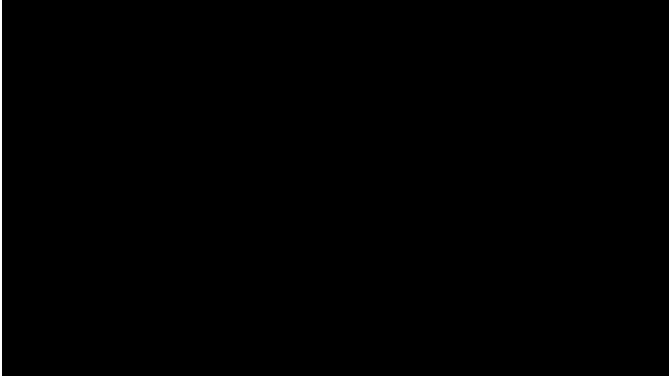
- Keep patient warm
- Be gentle when moving/repositioning to prevent breaks in skin integrity
 - Frequent physical assessment of skin and mucus membranes
- Vascular access
 - Need 2 large bore IVs (at least 16 gauge)
 - Arterial or central lines may be needed
 - BUT avoid IV starts, blood draws, and blood pressures when possible
- Strict I&Os including urine output and QBL
- Fluid replacement per order
- Blood product transfusion per order
 - Serial monitoring of labs per order

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TREATMENT: NURSING INTERVENTIONS

- Frequent vital signs and LOC checks
- If still pregnant: Monitoring of fetal heart rate and uterine contractions
- Administer O2 per order
- Prepare for transfer to ICU
 - Mechanical ventilation may become necessary (particularly if amniotic fluid embolism is cause)

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TREATMENT: CORRECTING THE UNDERLYING PROBLEM

Find the cause and stabilize:

- Placental abruption
 - Potential emergency c/s delivery
- Amniotic fluid embolism
 - CPR if patient arrests, Intubate if needed, Potential for emergency or perimortem C/S
- Severe preeclampsia, Eclampsia, and HELLP
 - Antihypertensives, delivery
- Intrauterine fetal demise (IUFD)
 - Induction of labor
- Massive hemorrhage
 - Medications, postpartum fundal massage, extraction of placenta fragments, potential for emergency hysterectomy

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TREATMENT: BLOOD PRODUCTS AND HEPARIN

Red Blood Cells (RBC)	More oxygen to blood and tissues, restores tissue perfusion
Platelets	Best component to increase circulating platelets, use if count is <10,000-20,000 or perioperative count is <50,000
Fresh Frozen Plasma (FFP)	Used for clotting factor (contains concentrated factor III) replacement, not volume replacement
Cryoprecipitate	Alternative to FFP for volume restricted patients (concentrated factor VIII, XIII, and fibrinogen)

Heparin

- Neutralizes thrombin by accelerating activity of Factor III
 - Sudden severe onset of DIC can delete Factor III and render heparin ineffective
- Should not be used prophylactically for coagulopathies due to increased risk of intracranial bleeding

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TREATMENT: POTENTIAL COMPLICATIONS

- Pulmonary edema
- End organ failure
 - Acute respiratory distress syndrome
 - Acute renal failure
- Transfusion reactions or infections
- Death due to hemorrhage and shock

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TREATMENT: OTHER CONSIDERATIONS

- Remain calm and reassuring toward patient and family
- Explain procedures and equipment – there will be a lot of unfamiliar
- Keep support people in the loop throughout the process
- If postpartum, another RN should be responsible for the baby's care and promoting bonding when appropriate

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THE END

Questions?

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