

Gomel State Medical University
Department of Obstetrics and Gynecology

Hemorrhagic shock, DIC-syndrome in obstetrics

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Definition

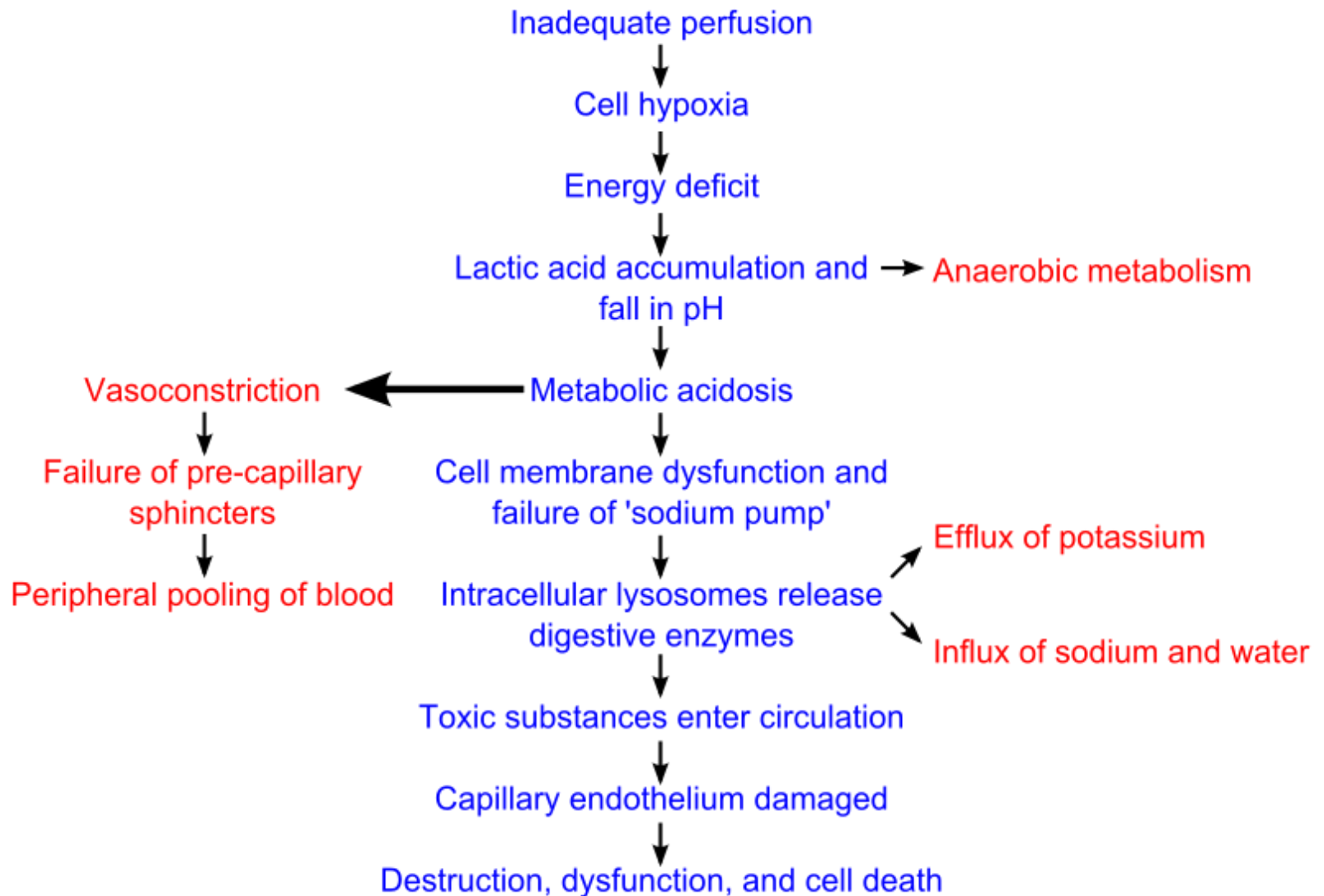
- HS - critical condition associated with acute blood loss, resulting as crisis of macro - and micro-circulation syndrome and multiple organ and system failure.

Causes of HS in obstetrics

- Abruptio of placenta
- Placenta previa
- Uterine rupture
- Hypo-and atony of uterus
- Violation of the placenta in the III stage of labor
- Cervical pregnancy

- shock is a result of blood loss over 1000 ml, ie over 20% of CBV;
- 1500 ml blood loss (more than 30% of CBV) is massive and life threatening;
- CBV for women is 6.5-7% of body weight;

HS pathogenesis



Shock organs

- the vital organs, the function of which most dependent on tissue perfusion disorders caused by loss of blood.

- Shock lung edema, fibrosis, respiratory distress syndrome (ARDS).
- Shock kidney: oligo, anuria.
- Shock liver: hypoproteinemia, impaired detoxification function, decreased production of clotting factors.
- Brain: headaches, irritability, lethargy, loss of consciousness.

Stage of HS

I St. - Compensated shock

II St. - Reversible decompensate shock

III St. - Irreversible shock



Clinical Signs of Shock

	Class 1	Class 2	Class 3	Class 4
Blood Loss Volume (mls) in adult	750mls	800 - 1500mls	1500 - 2000mls	>2000mls
Blood Loss % Circ. blood volume	<15%	15 - 30%	30 - 40%	>40%
Systolic Blood Pressure	No change	Normal	Reduced	Very low
Diastolic Blood Pressure	No change	Raised	Reduced	Very low / Unrecordable
Pulse (beats /min)	Slight tachy- cardia	100 - 120	120 (thready)	>120 (very thready)
Capillary Refill	Normal	Slow (>2s)	Slow (>2s)	Undetectable
Respiratory Rate	Normal	Normal	Raised (>20/min)	Raised (>20/min)
Urine Flow (mls/hr)	>30	20 - 30	10 - 20	0 - 10
Extremities	Normal	Pale	Pale	Pale & cold
Complexion	Normal	Pale	Pale	Ashen
Mental state	Alert, thirsty	Anxious or aggressive, thirsty	Anxious or aggressive or drowsy	Drowsy, confused or unconscious

Diagnosis of HS

- The color and temperature of the skin (pale and cold, then marmorate and acrocyanosis);
- Heart rate, blood pressure, "shock index" Allgover: ratio of pulse rate to the level of systolic blood pressure (normal 0.5, with a decrease of 20-30% CBV - 1.0, 40% - 1.5).
- Hourly urine output (normal 50-100 ml / h, <15 ml / h - irreversible shock);
- The central venous pressure (normal 5-12 cm water <5 - hypovolemia);
- Common blood: reducing red blood cells, hemoglobin, hematocrit (normal 0.43 0,38-0,32 corresponds blood loss 1000 ml, 0.30 - 0.22 - 1500 ml and less than 0.22 - 1,500 mL);
- Acid-base status;
- Coagulation, ECG, pulse oximetry, respiratory rate, blood chemistry, X-ray of lungs.

Principles of therapy HS



Start treatment as soon as possible **earlier**, to hold it in a **complex, together** obstetrician and anesthetist-resuscitator, including causes of bleeding.

1. Haemorrhage stopping: conservative and surgical methods
2. HS II - Indications for surgical methods.
Operation at HS III - operation despair.

Principles of therapy HS

2. Restores CBV, maintaining macro-and microcirculation, adequate tissue perfusion (infusion-transfusion therapy);
3. Artificial ventilation;
4. Treatment of DIC, colloid-osmotic pressure violations, protein and water and electrolyte metabolism, correction of acidosis;
5. Anesthesia, hypoxic brain protection;
6. Maintaining adequate urine output (50-60 ml / h);
7. Maintenance of cardiac, liver function;
8. Broad-spectrum antibiotics.

Recommended medicins



- Hydroxyethyl starch solutions (6 and 10% solution HAES, Refortan, stabizol) - 20 ml / kg body weight.
- Fresh frozen plasma (15 ml / kg body weight) – replacement of clotting factors.
- Salt solutions (Ringer Trisol, acesol 30 ml / kg body weight) .
- Glucose 10 or 20% with pananginum (15 ml / kg).
- Red cells (Hb <80 g / L and Ht <25%) - the restoration of the oxygen functions of the blood.
- Inhibitors of proteolysis: ovomisin, contrycal (10 000 IU / h) - the suppression of excessive fibrinolysis;
- Corticosteroids: hydrocortisone (100 mg / kg / day).

Volume and structure of fluids

(1:0,2:1:1- crystalloides)

Blood loss	10-15%	15 -25 %	30-40 %	>40 %
	500 -750	750 -1250	1500-2000	>2000 мл
Fluid volume	150-200%	200-250%	300%	300% > blood lose
Saline solutions	1200	1200-1600	1600-2000	1600-2000
Glucose 10, 20%	-	400	800	800
Colloid	400	600-1000	800-1200	1200-1500
Albumin,10%	-	100	100-200	200-300
Plasma	-	1000	1500	1500-2000
Red blood cells	-	-	400-600	600-1000
Platelets	-	-	-	doses

DIC-syndrom

- It is a dynamic process that develops as a result of the internal activation of the hemostatic system in response to the penetration of procoagulant material into the bloodstream.
- DIC-syndrom progresses to the stage of platelet aggregation and fibrin formation: formation of microthrombi in microvascular, activated fibrinolytic system splits fibrin and fibrinogen with the release of their degradation products, dramatically increases the activity of plasmin.





Introducton

- Blood has a complex mechanism to keep the balance between coagulation and anticoagulation by which blood maintains its fluidity.
- The process of haemostasis involves spasm of injured vessels, restriction of blood flow, formation of short-term platelet plug to seal minor vessels and formation of strong fibrin clot, at last thrombus formation which closes the wound.
- The thrombus may be dissolved as soon as the injured vessel has healed in order to restore tissue perfusion.

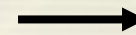
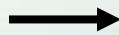
Definition

Disseminated intravascular coagulation (DIC) is a complex systemic thrombohemorrhagic disorder involving the generation of intravascular fibrin and the consumption of procoagulants and platelets. The resultant clinical condition is characterized by intravascular coagulation and hemorrhage.

Coagulation

Hypercoagulable state

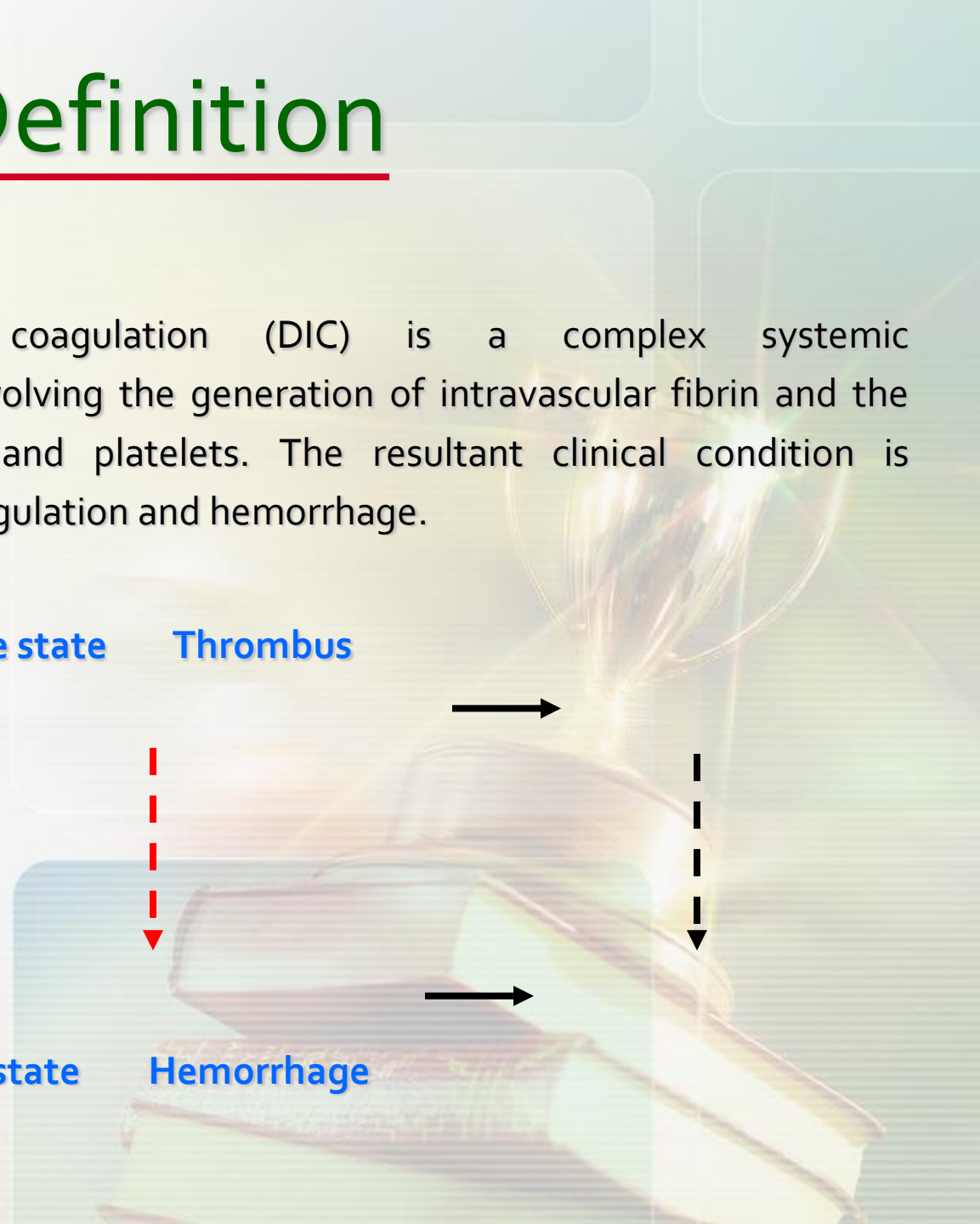
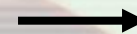
Thrombus



Fibrinolysis

Hypocoagulable state

Hemorrhage



Obstetric causes of DIC.

- All kinds of shock (hemorrhagic, septic, anaphylactic, pain);
- Premature detachment of normally situated placenta (abruption of placenta);
- Amniotic fluid embolism;
- Gestosis, preeclampsia, eclampsia;
- Pulmonary embolism;
- Septic complications (sepsis, peritonitis, thrombosis);
- Antenatal fetal death;
- Decompensation of heart defects

Phase of the DIC-syndrom (by ZD

Fedorova (1979), Barysheva BA (1981)

- I. Hyperaggregation, hypercoagulation;
- II. Hypocoagulation (consumption coagulopathy) without generalized activation of fibrinolysis;
- III. Hypocoagulation (consumption coagulopathy with generalized activation of fibrinolysis - secondary fibrinolysis);
- IV. Complete incoagulability, terminal hypocoagulation

Forms of DIC syndrome, depending on the duration of phase I

- Fulminant - from a few seconds up to 1-2 hours (amniotic fluid embolism);
- Acute - 1-2 days (placental abruption, uterine rupture, shock);
- Subacute - up to 1 week (severe preeclampsia);
- Chronic - more than 1 week (may be more than one month): PIH, sepsis, antenatal fetal death.

DIC-syndrome clinic

- **Phase I:** thrombosis, the formation of high-grade clusters.
- **Phase II:** bleeding at the injection, tissue surgical field, the birth canal to form a loose, but not spontaneously lysed blood clots.
- **Phase III** - to coagulologic type of bleeding join capillary and hematoma, that is, on the skin and mucous membranes appears profuse haemorrhagic rash prone to merge. Possible spontaneous bruising. Increases bleeding tissue surgical field, the birth canal, form a unit, loose, spontaneous lyses clots.
- **Phase IV** (complete incoagulability), accompanied by profuse bleeding even from intact mucous membranes (nose, mouth, vagina, etc.) and tissue surgical field, and the resulting blood clot does not form.

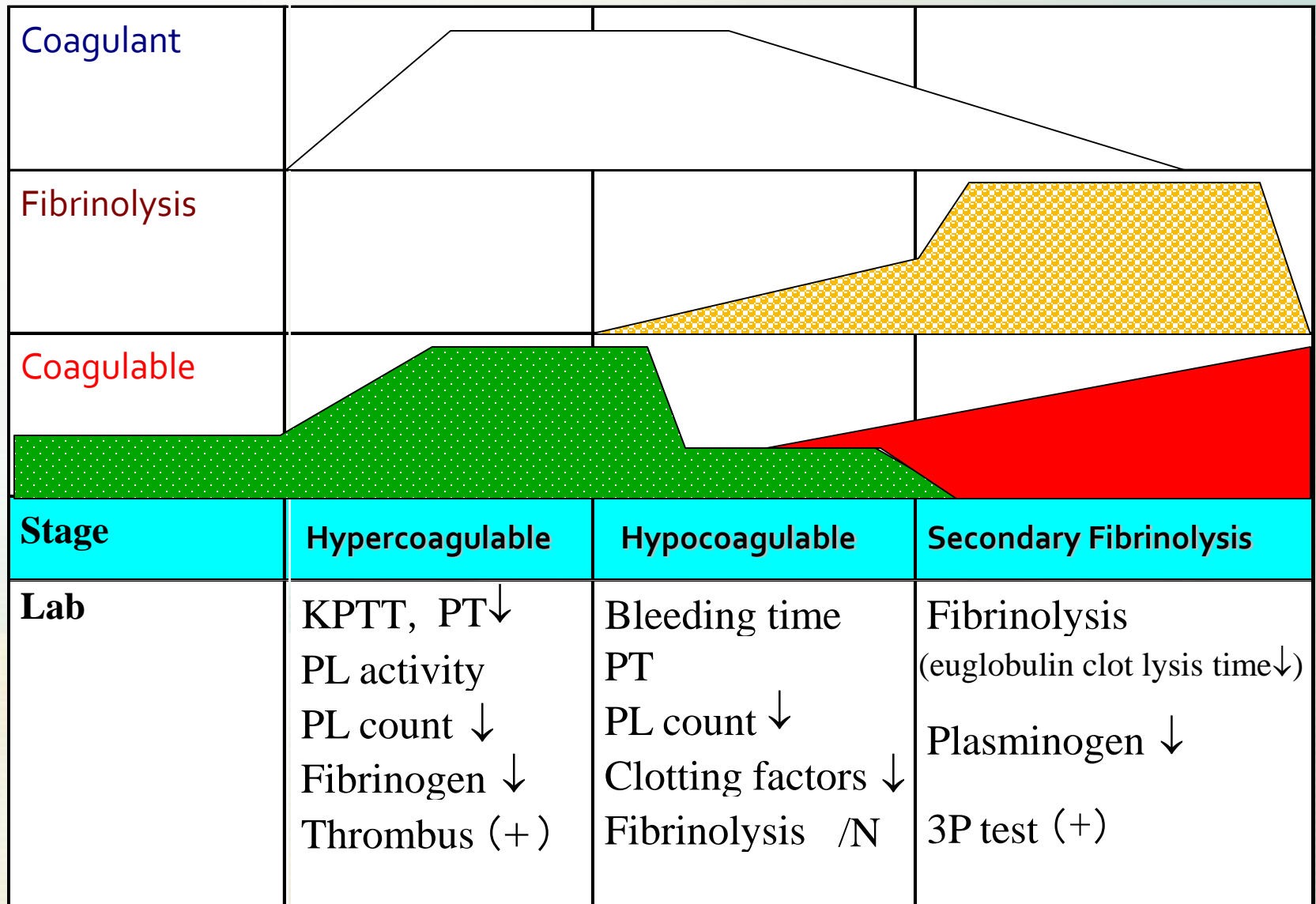
The main clinical manifestations of DIC:

- thrombotic events;
- hemorrhagic syndrome;
- microcirculatory disorders;
- multiple organ failure;
- anemia;
- hemodynamic instability;
- shock and formation of shock organs.

Laboratory diagnosis of DIC:

Coagulogram, platelets level

	Hypercoagulation	Norma	Hypocoagulation
platelets level	175-425 (N)	175-425 (N)	< 100
Fibrinogen	>5-6 g/l	2-4 g/l	<1,5 г/л
Prothrombin time, PT	>	0,8-1,1	<0,8
APTT	<35 s	35-45 s	> 65 s
D-dymers	>0,5 mkg/ml	< 0,5 mkg/ml	>0,5 mkg/ml



Principles of treatment of DIC

OBJECTIVES:

1. the main reasons that caused elimination;
2. normalization of hemodynamics,
3. normalize of blood coagulation.

Stop the bleeding.

ITT = crystalline: colloid: albumin: blood = 1:1:0,2:1.

Managed hemodilution: transfusion drugs with high oncotic pressure = quick recovery BCC and microcirculation.

Safety criteria of hemodilution: Ht at least 0,25, Hb at least 70 g / l.

Prednisolone 80-100 mg \ iv;

CORRECTION Hemostatic

- In the phase of hypercoagulability: heparin, low molecular heparins, disaggregants.



Coagulopathic bleeding

**USE
NOVOSEVEN,
OCTAPLEX**

WHAT I HAVE TO DO???

Recombinant
coagulation
Factor VIIa.

Protrombine factors II, VII, IX, X,
proteins C S.

- [?] contrycal 60-100 thousand of IU or
- [?] gordox 600-1000 thousand of IU
- or
- [?] trasilol 100-300 thousand IU
- [?] ovomin 120-180 thousand of IU
- in / tively one stage, the maintenance
dose in 2 hours



III / kg body
ht
after protease
dly for 30-40

5 %
avenous

with fibrinogen <1 g /
n platelet
ph10g / l - 1 dose 10