

Interpretation of CTG & CFHM during Antepartum & Intrapartum Periods

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Risk Factors to Consider

- Postdated pregnancy
- IUGR
- Other conditions associated with placental insufficiency e.g. AP / PP
- No liquor / thick MSL at ROM
- At term / preterm PROM
- Suspicious FHR trace before
- Rupture of uterus

Pathological factors affecting the fetal heart rate

- Maternal thyroid status: thyrotoxicosis
- Structural abnormalities of fetal heart
- Infection e.g. Chorioamnionitis
- APH
- Fetal anaemia / anomalies
- Cord compression accidents
- Oligohydramnios

Clinical factors affecting fetal heart rate

- Duration of first stage of labour
- Maternal fever
- Epidural Anaesthesia
- Maternal age
- MSL
- Maternal smoking
- Medication: Pethidine, Bricanyl

Factors Influencing Fetal Heart Rate (1)

Main regulators of fetal heart rate:

Physiological

A) Autonomic nervous system

- Parasympathetic nervous system
(slow HR)
- Sympathetic nervous system
(increase HR)

Factors Influencing Fetal Heart Rate (2)

B) Baroreceptor

- sensitive to arterial blood pressure
- present in the major arteries and the aorta
- responsible for dramatic bradycardia seen in response to *cord compression*

C) Chemoreceptor

- responding to blood gas tension (PO_2)

Factors Influencing Fetal Heart Rate (3)

D) Rest (sleep) / Activity (wake) cycles

Rest (sleep)

- Little or no breathing movement
- Little body movement
- Decreased FHR

Activity (wake)

- Fetus moves its limbs
- Makes breathing movements
- Exhibit a rise in FHR

Factors Influencing Fetal Heart Rate (4)

Non-physiological

- 1) Hypoxia
- 2) Prematurity
- 3) Drugs (sedatives, antihypertensives, anaesthetics)
- 4) Local anaesthetic
- 5) Congenital malformation of CNS
- 6) Cardiac arrhythmias

Definitions (1)

- *Baseline heart rate*

- *Baseline variability*

Physiological control of fetal heart rate

-- 4/52 heart begins to beat

-- 15/52 HR about 150 bpm

-- 30/52 HR about 135 bpm until term

Definitions (2)

- *Prolonged bradycardia*

Definition: FHR < 100 / min for 3 min or < 80 for 2 min

Causes: -- cord compression / prolapse
-- Abruptio placentae
-- Scar rupture
-- Uterine hyperstimulation
-- Vagal stimulation (PV exam)

Definitions (3)

Course:

- In the absence of pathologies - most cases show recovery within *6 min*, and return to baseline within *9 min*
- If recovered within 6 min with good variability - observe
- If not recovered by 9 min arrange for urgent delivery

Definitions (4)

- *Tachycardia*

Definition: Baseline HR > 150 bpm due to

Fetal:

- movement

- arousal

- hypoxia

- anaemia / hypovolaemia

Definitions (5)

Maternal:

-- dehydration

-- sympathetic activation e.g. fever

-- Betamimetics e.g. brianlyl

Definitions (6)

- *Acceleration*

Definition: transient increased in HR ≥ 15 bpm for ≥ 15 seconds, ≥ 2 accelerations within 20 min denotes reactive pattern.

- *Deceleration*

Definition: transient slowing of heart rate below baseline of ≥ 15 bpm for ≥ 15 seconds

Definitions (7)

- *Early deceleration (type I dip)* - onset with contraction, mirror image of contraction
 - compression on fetal head: rise in ICP stimulates the vagal nerve
 - seen in late stage of labour, malposition, vaginal examination, ARM
 - In non-hypoxic fetus increased variability ± rebound acceleration

Definitions (8)

Pathological in the following situations

- not in labour / infrequent contractions
- head not engaged / not in OP or OT position
- poor / delayed recovery
- baseline shift / decreased baseline variability

Definitions (9)

- no accelerations in between / with fetal movements
- “W” configuration (biphasic)

Note: with silent pattern, any deceleration of whatever degree is ominous - terminal pattern

Definitions (10)

- *Late deceleration (type II dip)*

Definition: onset 30-60 seconds after onset of contractions, nadir & recovery all out of phase

-- *oxygen* in retroplacental reservoir used up during contraction → hypoxaemia till full reoxygenation after relaxation

Definitions (11)

- speed of recovery reflect *blood flow* -
 ↑speed of recovery → ↑blood flow to
 placenta (good placental perfusion)

- decreased variability and shift in baseline
 after deceleration implies *hypoxia*

Definitions (12)

- *Variable deceleration*
 - cord compression, tends to vary because of the site and manner of compression
vary each time
 - seen in oligohydramnios, malpresentation, cord presentation and prolapse, cord complications, OP position

Definitions (13)

- compression on vein before artery →
initial decrease in venous return →
tachycardia
- when artery also compressed →
baroreceptor activated → *bradycardia*
- released of the compression →
increase arterial flow → *tachycardia*

Definitions (14)

- acceleration before and after the deceleration called “*shouldering*” - denotes healthy fetus
- progression to: tachycardia, ↓ variability, loss or exaggerated “*shouldering*”, late recovery, biphasic deceleration - denotes pathological changes

Definitions (15)

- *Sinusoid pattern*

Definition: frequent < 6 cycles / min,
amplitude ≤ 10 bpm, duration ≥ 20 mins

Cause:

- healthy fetus - rhythmic mouth movements (disappear after 2-3 mins)
- fetal anaemia - Hb Barts, Rh, infection
- fetal hypoxia

Definitions (16)

Differentiation:

Healthy fetus suggested by:

- *accelerations of FHR* in response to stimulation
- *reactivity* or normal baseline variability before / after
- *saw-tooth pattern* rather than smooth rounded pattern

Definitions (17)

- *Silent pattern*
 - baseline variability of *0 - 5 bpm*
- *Terminal pattern*
 - *persistent silent pattern* not responding to stimuli, with or without shallow decelerations

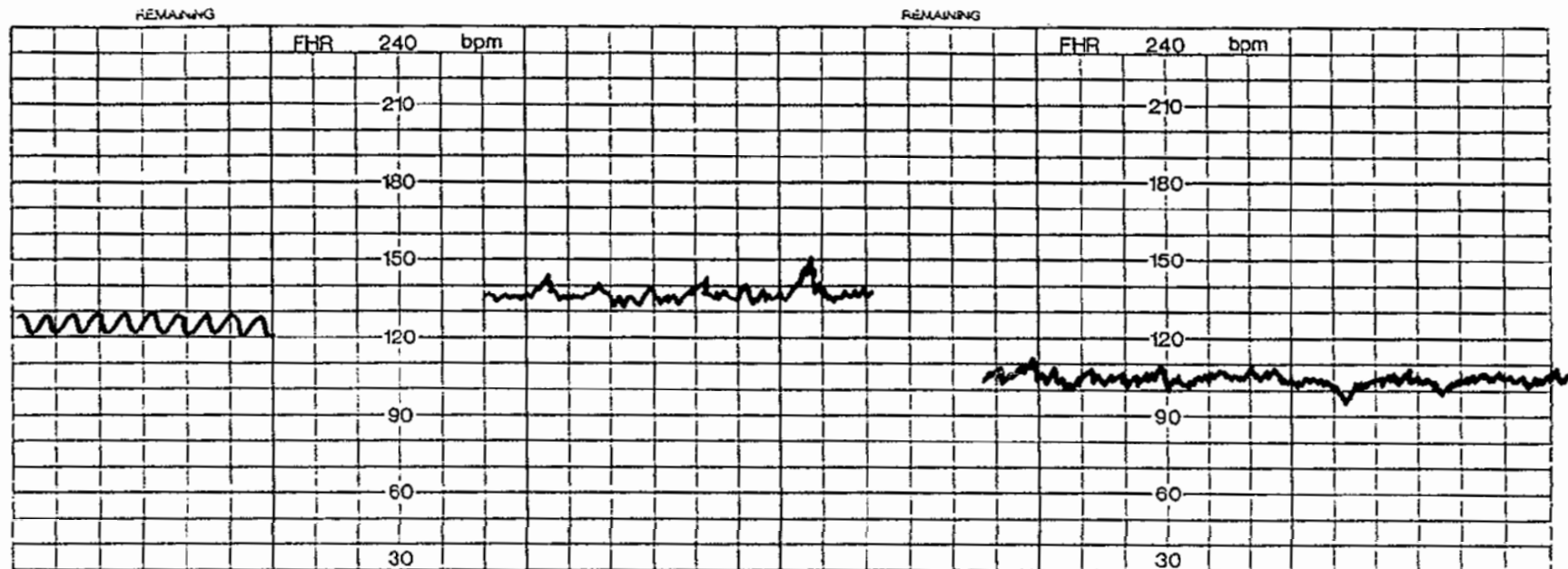
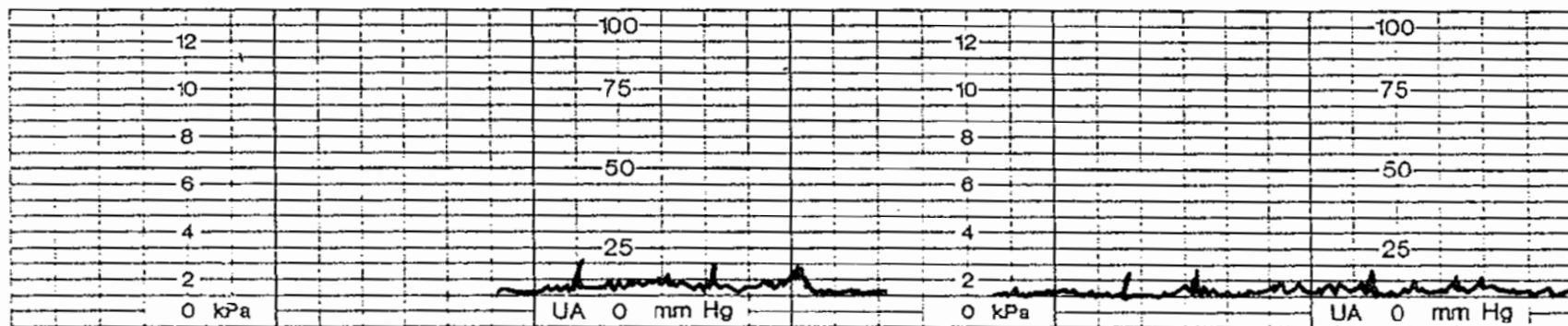


FIG. 1

FIG. 2

FIG. 3



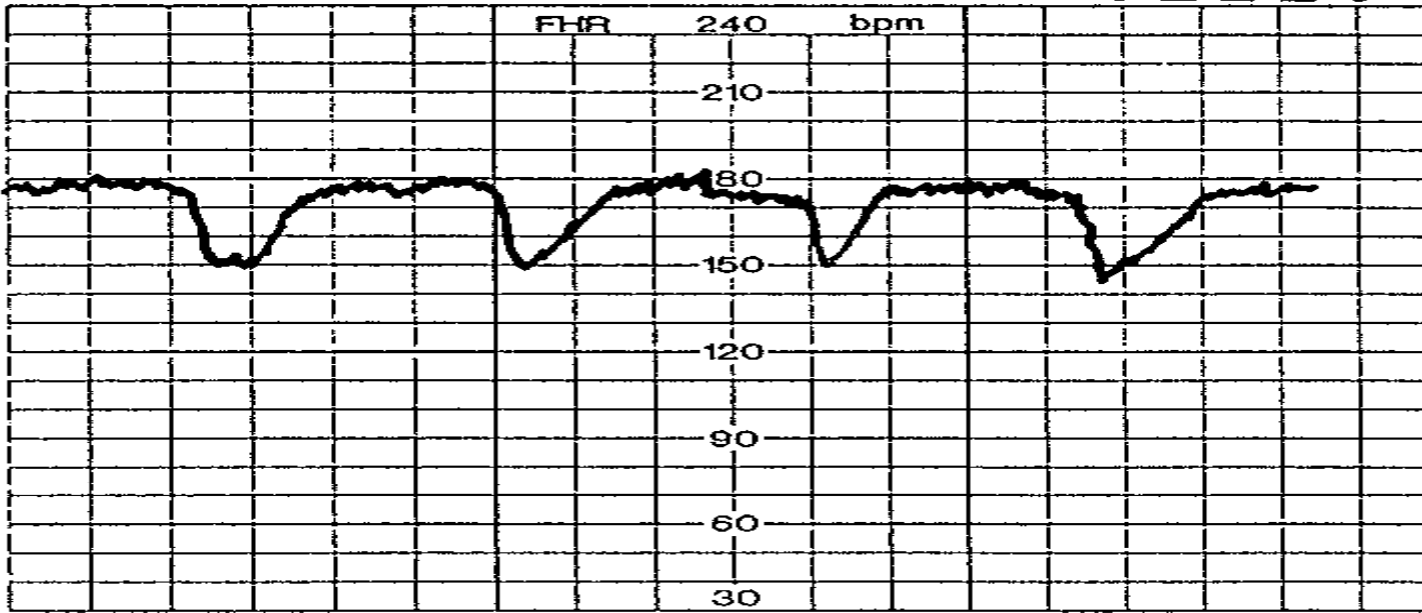
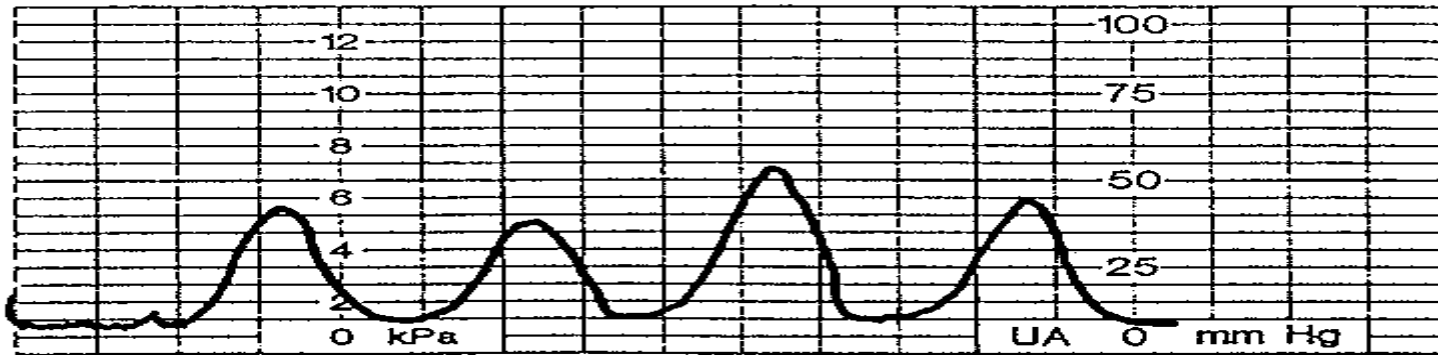


FIG. 4



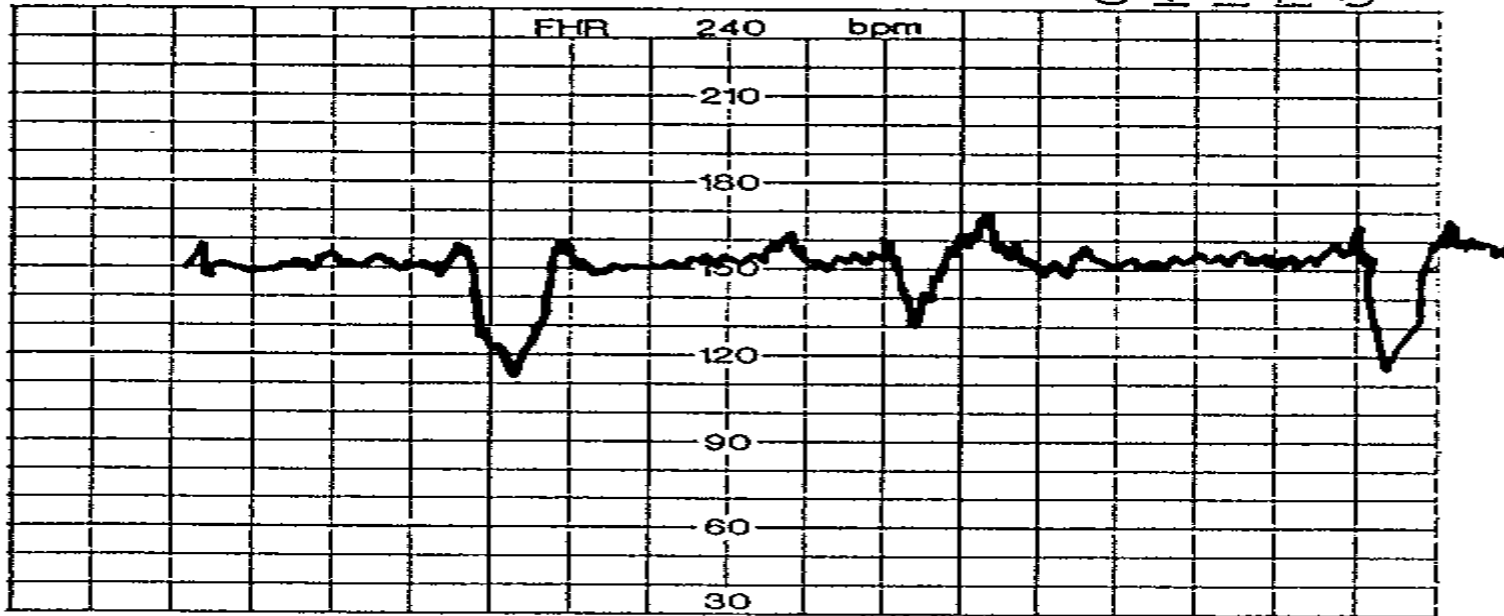
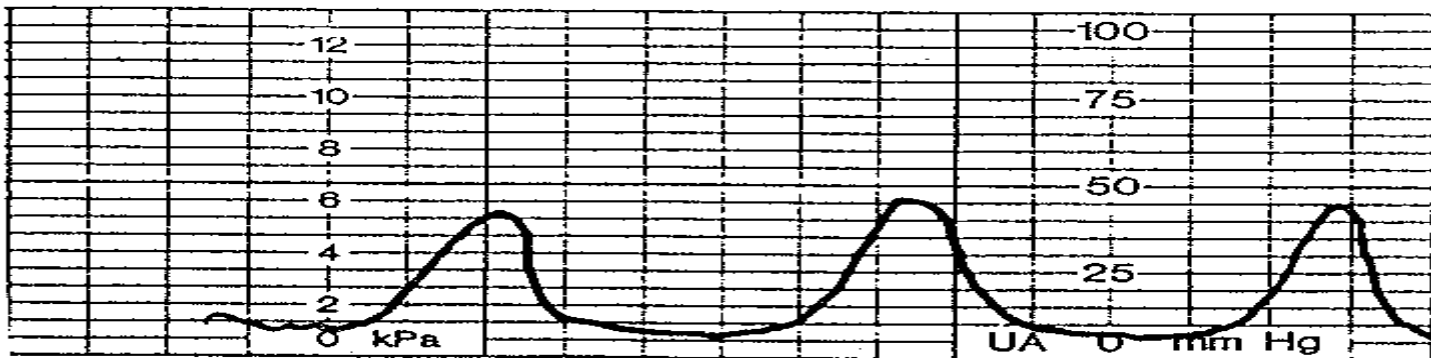


FIG. 5



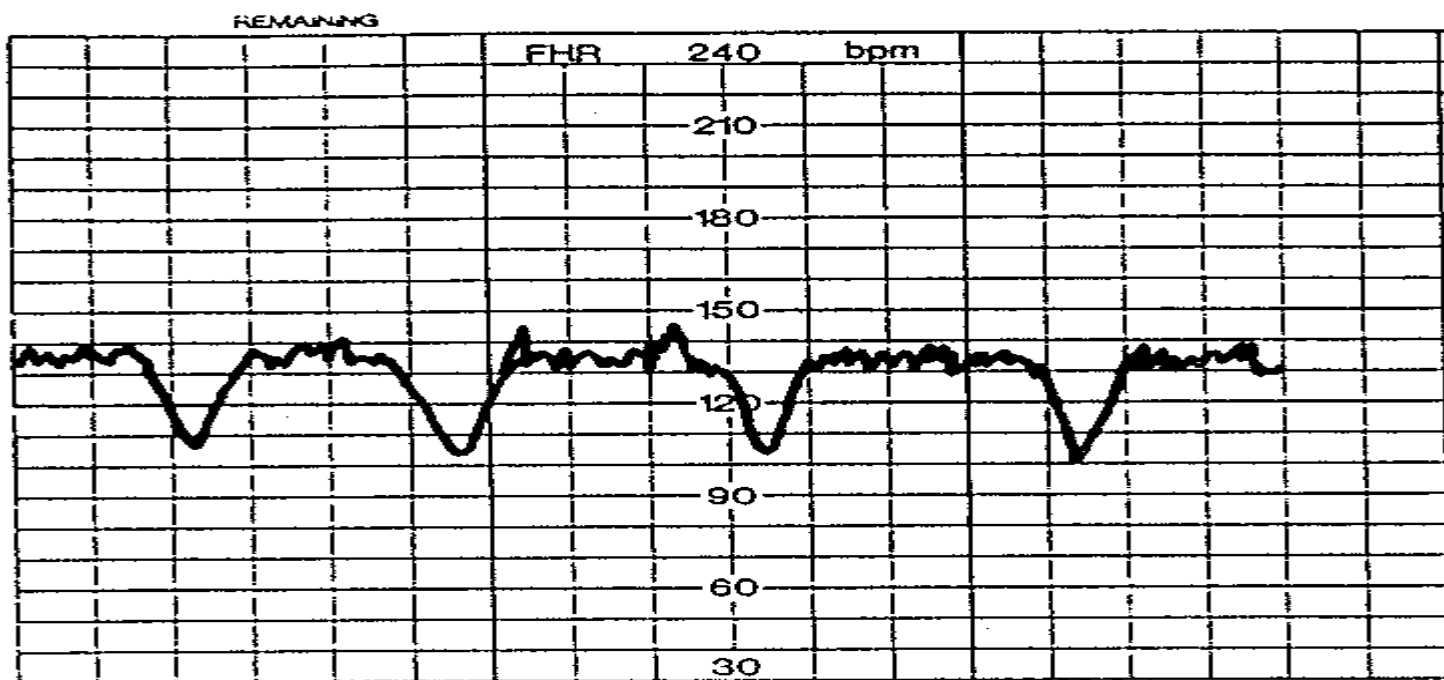
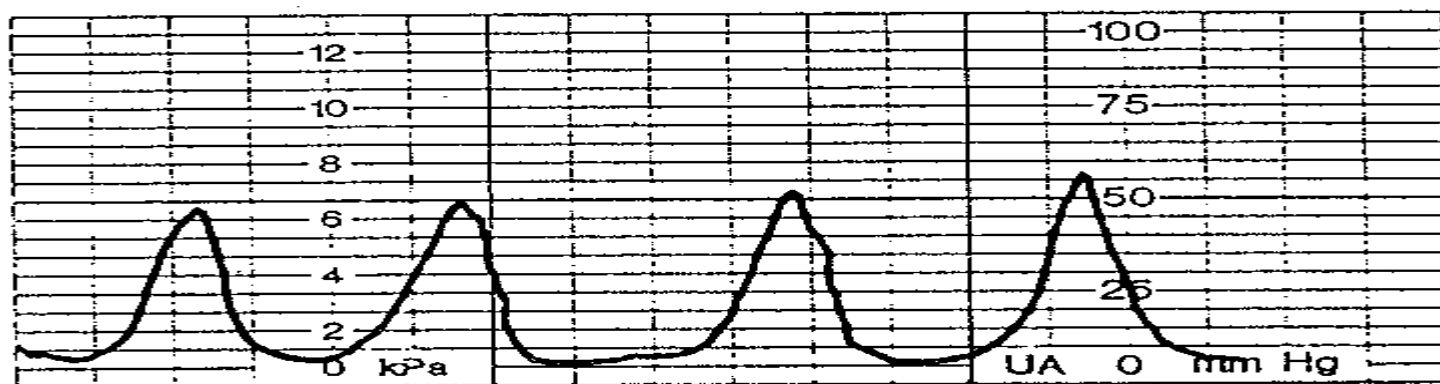


FIG. 6



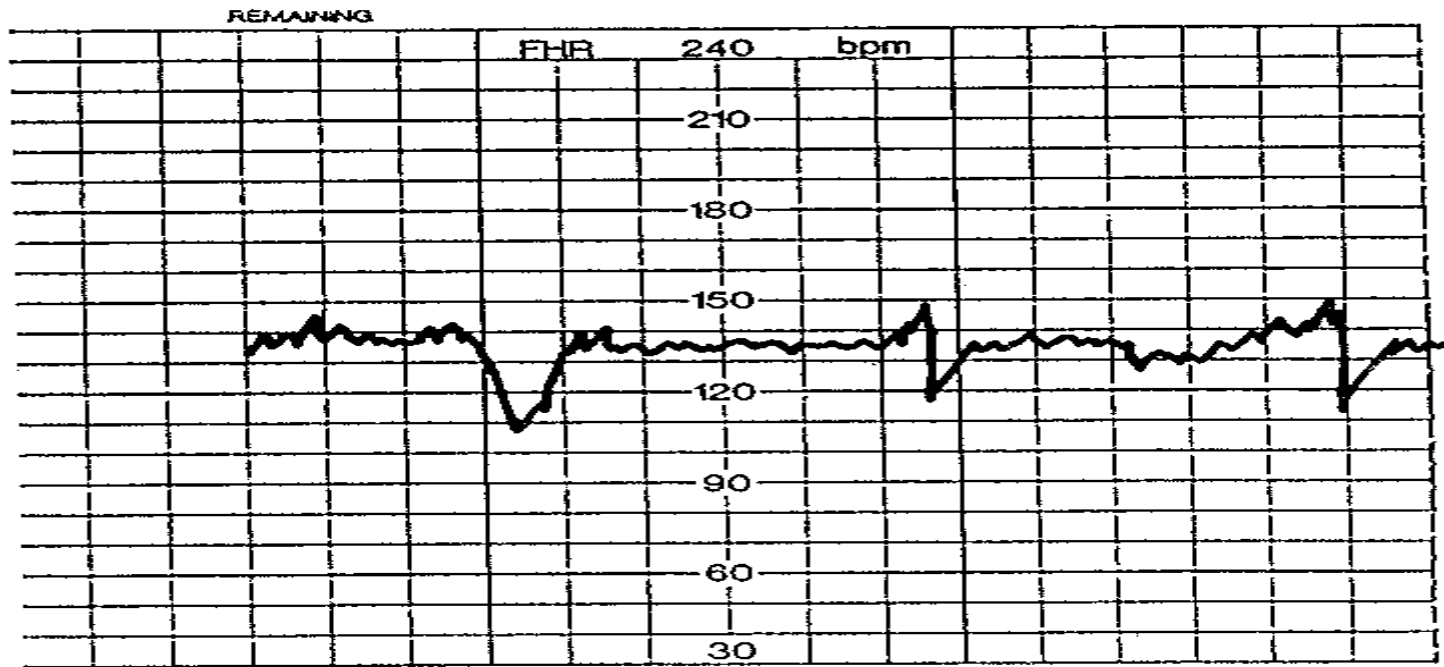
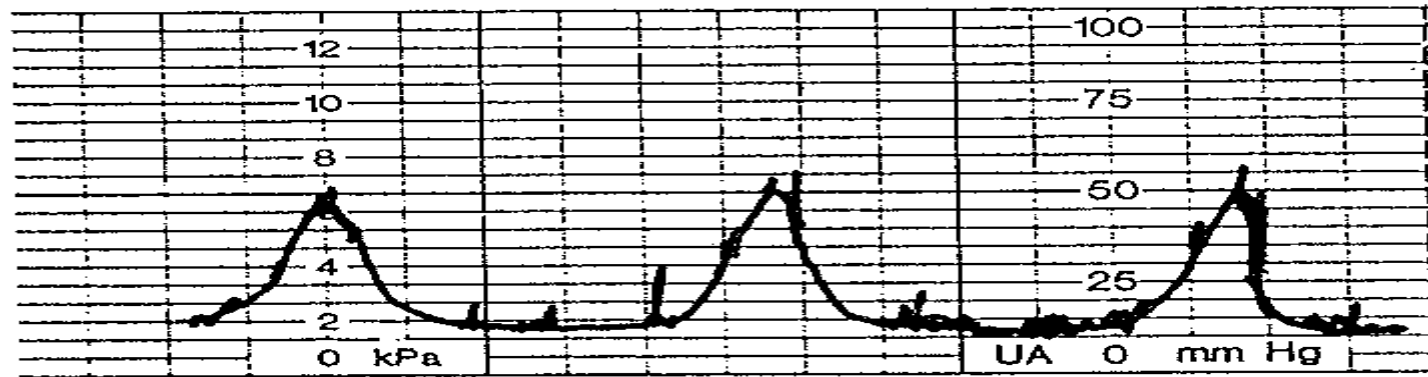


FIG. 7



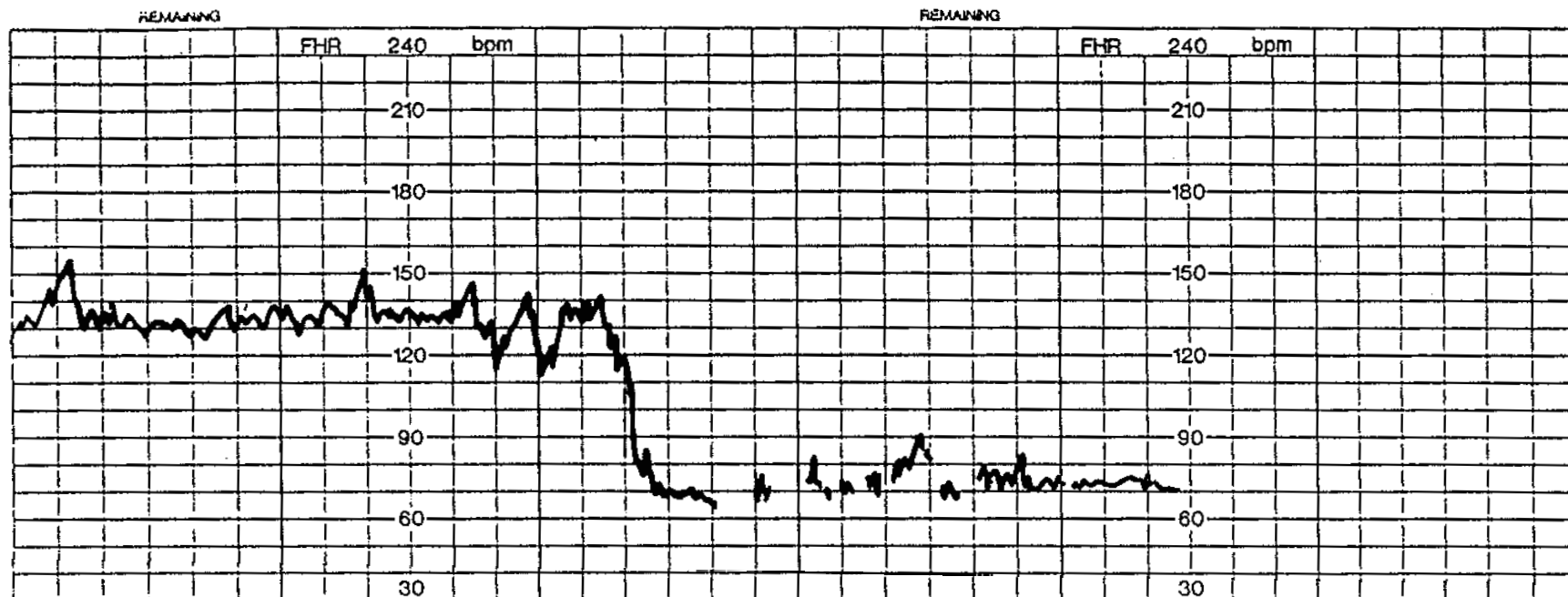
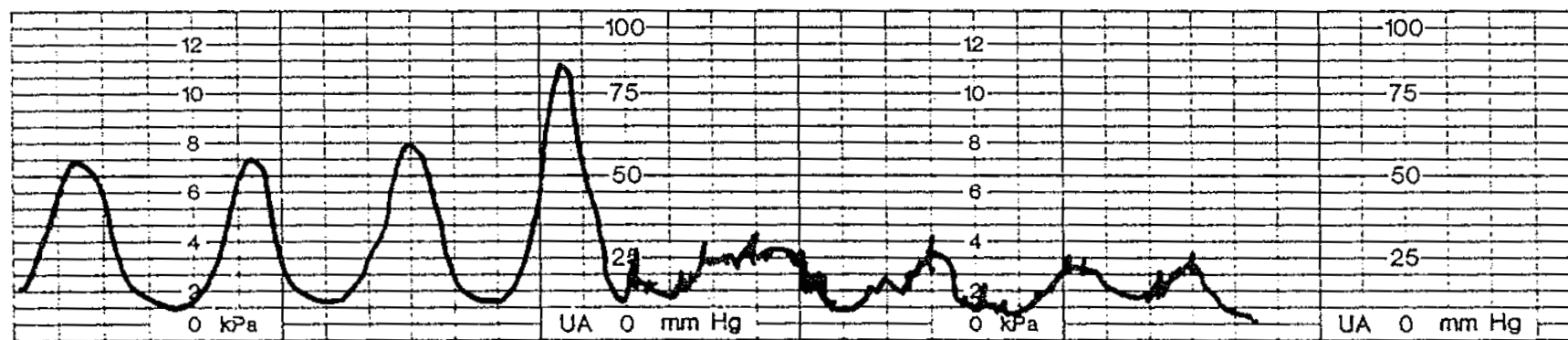


FIG. 8



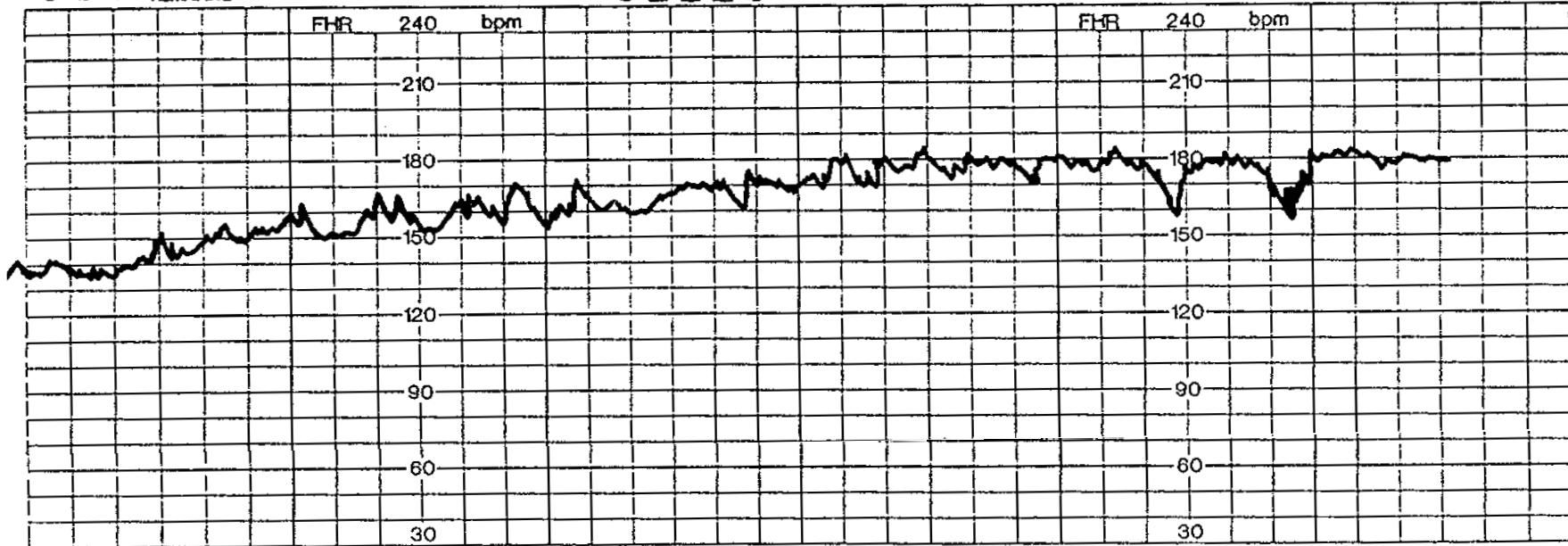
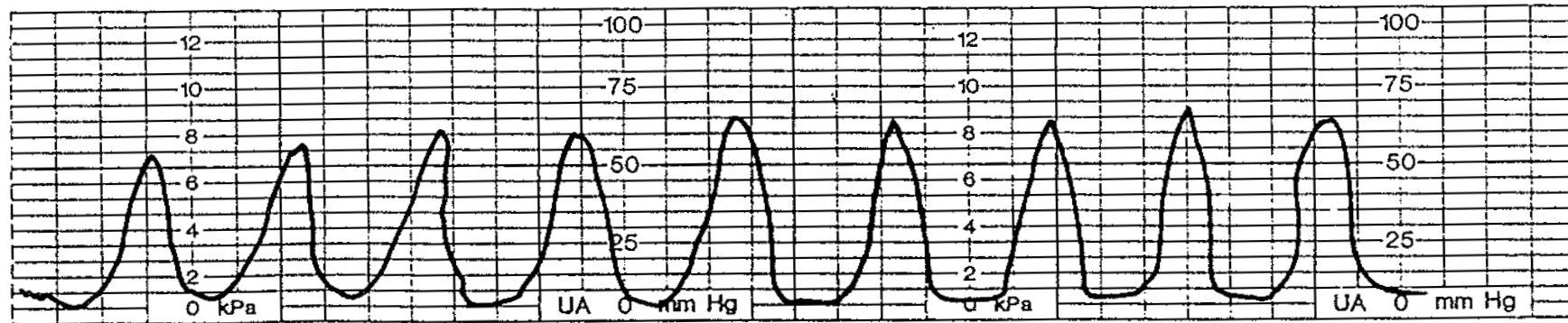


FIG. 9



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COROMETRICS MEDICAL SYSTEMS, INC.

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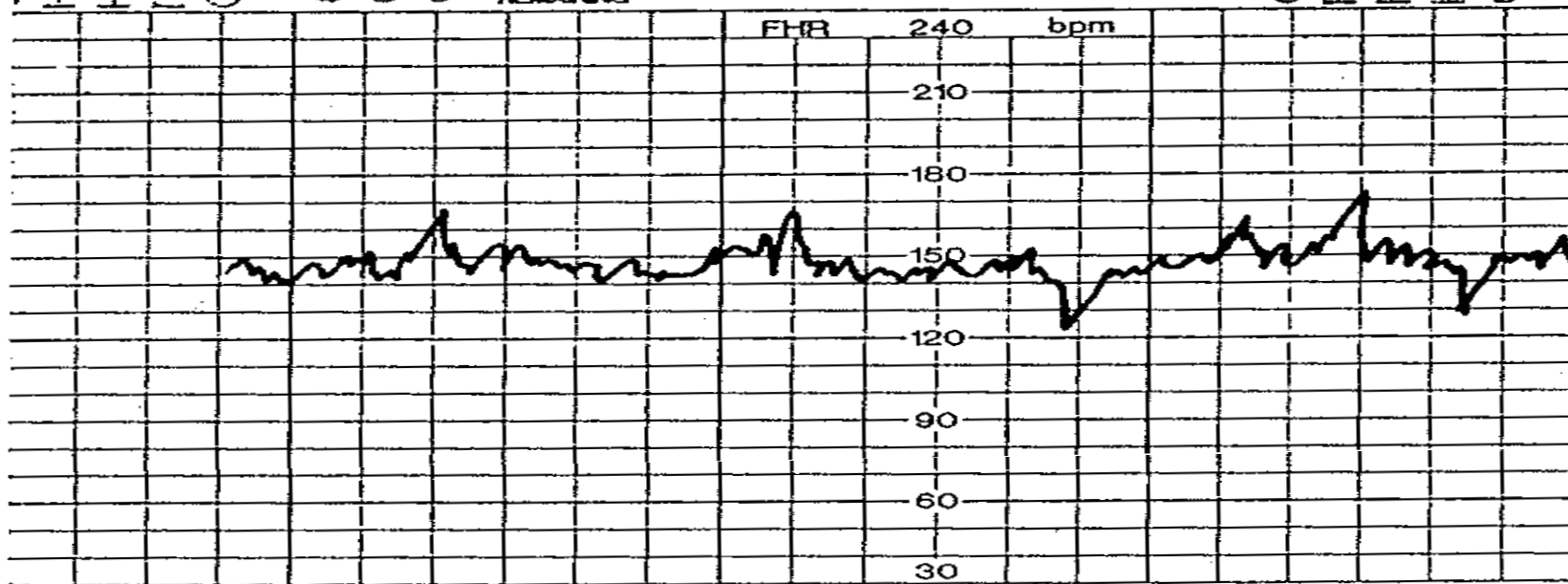


FIG. 10 .

