


Antenatal Assessment & Prenatal Care Overview

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1
Part I: Prenatal and Genetic Testing

2
Part II: Initial Prenatal Care

3
Part III: Follow-Up Prenatal Care Appointments

AGENDA

2

PRENATAL AND GENETIC TESTING

PART I

3

GENETIC COUNSELING

- Prior to:
 - State Screening (1st & 2nd Trimester Screening)
 - DNA Sequencing or Non-invasive Prenatal Testing (NIPT)
 - Chorionic villus sampling (CVS)
 - Amniocentesis
- Preconceptually
 - Ideal counseling
- Optional testing – patient is not required to have genetic testing

4

GENETIC TESTING OVERVIEW

Screening Tests:

- 1st Trimester Screening (combined)
 - Nuchal Translucency ultrasound & Serum screen
 - PAPP-A
 - hCG
- 2nd Trimester Screening
 - Serum QUAD (aka AFP testing)

Diagnostic Tests:

- CVS
- Amniocentesis

5

PRENATAL SCREENING TIMELINE

GESTATION IN WEEKS

6

1ST TRIMESTER SCREEN (COMBINED NT ULTRASOUND & SERUM)

- When**
 - NT u/s: 11 2/7 – 14 2/7 weeks
 - Serum: 10 1/7 – 13 6/7 weeks
- Pro**
 - Higher detection rate
 - 85-90% Downs
 - 80% Trisomy 18
 - Earlier results
- Cons**
 - Fetal screen only, not diagnostic
 - Only looks for Tri 18 & Tri 21 (Downs)
 - Maternal anxiety due to need to wait for 2nd tri flu (QUAD)
 - NT not covered by all insurances

7

NUCHAL TRANSLUCENCY (NT) ULTRASOUND 11 2/7 – 14 2/7 WEEKS

■ Normal ■ Abnormal

8

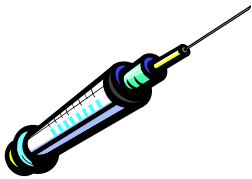
1ST TRIMESTER SCREEN (COMBINED NT AND SERUM)

- Ultrasound
 - Nuchal translucency

...PLUS...

- Blood serum (biochemical)
 - PAPP-A (↓ in Downs) (if increased = greater chance of Preeclampsia or placenta problems)
 - hCG (↑ in Downs)

9



2ND TRIMESTER QUAD SCREEN
AKA: EXPANDED AFP ALPHA-FETOPROTEIN

QUAD MARKER ANALYTES 4

Increased Risk for:	AFP	hCG	uE3	Inhibin-A
Neural Tube Defect	↑	Not used	Not Used	If (+), unable to make cholesterol
Trisomy 21 (Downs)	↓	↑	↓	↑
Trisomy 18	↓	↓	↓	leading to mental retardation

Maternal Age	Risk for Trisomy 21 ¹⁴	Risk for Trisomy 18 ¹⁵	Age at Term	Risk for Trisomy 21	Risk for Any Chromosome Abnormality ¹⁶
15	1:1140	1:830	15	1:1578	1:454
16	1:1120	1:800	16	1:1572	1:475
17	1:1110	1:810	17	1:1565	1:499
18	1:1100	1:820	18	1:1556	1:525
19	1:1090	1:830	19	1:1544	1:555
20	1:1080	1:840	20	1:1528	1:525
21	1:1050	1:810	21	1:1507	1:525
22	1:1030	1:800	22	1:1481	1:499
23	1:990	1:780	23	1:1447	1:499
24	1:940	1:760	24	1:1404	1:475
25	1:880	1:740	25	1:1351	1:475
26	1:810	1:720	26	1:1286	1:475
27	1:740	1:700	27	1:1206	1:454
28	1:670	1:680	28	1:1119	1:454
29	1:600	1:660	29	1:1018	1:416
30	1:540	1:650	30	1:909	1:384
31	1:480	1:640	31	1:796	1:364
32	1:420	1:630	32	1:683	1:322
33	1:360	1:620	33	1:574	1:285
34	1:300	1:610	34	1:474	1:245
35	1:240	1:600	35	1:384	1:178
36	1:180	1:590	36	1:307	1:148
37	1:118	1:580	37	1:242	1:122
38	1:114	1:570	38	1:189	1:104
39	1:108	1:560	39	1:146	1:90
40	1:100	1:550	40	1:112	1:82
41	1:92	1:540	41	1:85	1:88
42	1:84	1:530	42	1:65	1:88
43	1:76	1:520	43	1:49	1:90
44	1:68	1:510	44	1:37	1:95
45	1:60	1:500	45	1:28	1:18
46	1:52	1:490	46	1:21	1:14
47	1:44	1:480	47	1:15	1:10
48	1:36	1:470	48	1:11	1:11
49	1:28	1:460	49	1:8	1:8
50	1:19	1:450	50	1:6	1:6

QUAD SCREEN (AKA 2ND TRIMESTER SCREEN)

- When**
 - 15 – 20 weeks
 - accurate dating
- Why**
 - State law to offer
- Pros**
 - May detect NTDs, Down's, abdominal wall defects, congenital nephrosis
- Cons**
 - 5% false (+)
 - Maternal anxiety
 - Unnecessary f/u

13

NON-INVASIVE PRENATAL TESTING (NIPT)

14

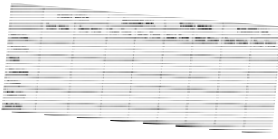
COMPARING DNA TECHNOLOGIES

- Amnio/CVS**
 - Diagnostic test
 - Microarray or Karyotype
 - From Amniotic fluid/Placental Villi
 - Many chromosomes analyzed
 - Very, very accurate
- NIPT**
 - Screening test
 - Cell-Free DNA through maternal blood
 - Trisomy 21, 18, and 13 only
 - Can detect gender
 - ↑ BMI may lead to ↑ false positive
 - Up to 98% accurate at picking up a true positive

15

FETAL MOVEMENT COUNTS

- When: typically around 28 weeks
- Why: ensure fetal well-being
- How: count movements in 1 hour, once a day
- Goal: 10 movements in 1 hour



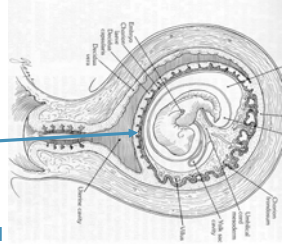
16

DIAGNOSTIC TESTING

CVS AND AMNIOCENTESIS

17

CHORIONIC VILLUS SAMPLING



Placental tissue (chorionic villi)


18

CHORIONIC VILLUS SAMPLING


- **When**
 - 8 ½ - 12 weeks
- **Why**
 - Abnormal Ist Tri Screen
 - Genetic history
 - (still offer QUAD later)
- **Pro**
 - Diagnostic: earlier results
- **Cons**
 - Cannot ID Neural-tube defects
 - Potential Fetal Loss
 - Maternal
 - Infection
 - Rh sensitization

19

Chorionic Villus Sampling




Male



Female

20

AMNIOCENTESIS



Trans-abdominal

Amniotic Fluid

21

AMNIOCENTESIS

- When**
 - 15 to 20 weeks for genetic testing
 - Later for Fetal Lung Maturity (FLM)
- Why**
 - Genetic testing
 - Fetal Lung Maturity
- Cons**
 - Fetal
 - Loss \leq 0.5- 0.9%
 - PTL, PTD, placental trauma
 - Maternal
 - Infection, trauma
 - Fluid leakage
 - Rh sensitization

22

CARRIER SCREENING

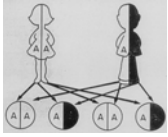
23

FAMILY GENETIC DISORDERS OVERVIEW

- Genetic disorders may be:
 - Autosomal recessive
 - Autosomal dominant
 - X-linked
 - Multifactorial inheritance

24

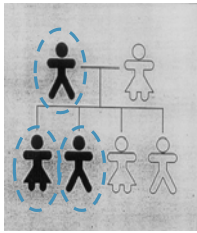
AUTOSOMAL RECESSIVE



- ♦ **Recessive Carrier Screening Test:**
 - One-time blood test may be performed at any time
 - If mom positive, then test dad
- ♦ **If only one parent is a carrier**
 - 50% of children will simply carry the gene
 - 50% will be completely unaffected
- ♦ **If both parents are carriers**
 - 25% chance the baby will HAVE the disease
- ♦ Cystic fibrosis, Tay-sacs, Sickle cell anemia

25

AUTOSOMAL DOMINANT

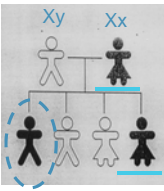


- If one parent is affected ...
 - 50% risk for each child
 - 2 out of 4 children with disease

Marfan's, Polycystic Kidney Disease, Achondroplastic Dwarfism

26

X-LINKED RECESSIVE



- If the mother carries the gene...
 - Male baby: 50% risk of *affected
 - Female baby: 50% risk of *carrier
 - Results in more males being affected
- G6PD, Color blindness, Hemophilia

27

X-LINKED DOMINANT

- Less common than X-Linked Recessive
- Works differently depending on if the mother, father, or both are carriers
- Rett Syndrome, Klinefelter's Syndrome

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28

MULTIFACTORIAL INHERITANCE

- Interactions
 - Genes to genes
 - Genes to environment
- Greater severity = greater risk of re-occurrence
- Club foot
- Cleft lip/palate
- Hydrocephalus
- Spina bifida
- Congenital hip dislocation

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29

INITIAL PRENATAL CARE

PART II

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30

PRIMARY FOCUS OF PRENATAL CARE

- Identify Risks!
 - Diabetes
 - Preeclampsia
 - Placenta problems
 - Amniotic fluid problems
 - Growth issues
 - Preterm labor
 - Birth defects or genetic concerns

31

PRENATAL CARE	"THE STORY"
▪ Demographic data →	Introduction
▪ Subjective data →	Her Story
▪ Objective data →	Our Story
▪ Assessment →	Complete Story
▪ Plan of Care →	Future Story

32

DEMOGRAPHIC DATA

<ul style="list-style-type: none"> ▪ Age ▪ Marital Status ▪ "Race" / genetic ancestry ▪ Education/language <ul style="list-style-type: none"> ▪ Teaching materials ▪ Learning needs ▪ Religion <ul style="list-style-type: none"> ▪ Refusal of blood products ▪ Special desires 	<ul style="list-style-type: none"> ▪ Occupation exposures <ul style="list-style-type: none"> ▪ Animal workers ▪ Toxoplasmosis ▪ Health care workers ▪ Radiation ▪ Teratogen exposures
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33

TERATOGENIC PERIOD

- **Classic period**
 - 31 to 71 days
- **Effects:**
 - Early gestation
 - Heart
 - Neural tube
 - Later gestation
 - Ear & Palate

34

TERATOGENIC EXPOSURES

- Hyperthermia
 - >101°C
- Rubella
 - Disease or immunization < 1 month prior to pregnancy
- ETOH / THC
- Cocaine
- Some anticonvulsants
- Caffeine
 - > 3 cups daily
 - Spontaneous AB
- Tobacco
 - Infertility
 - PTL/PTB
 - IUGR
 - SIDS
 - Methadone
 - No malformations to baby but will go through withdrawal

35

TERATOGENIC EXPOSURES

- * Antibiotics (Cat D)
 - Doxycycline
 - Bactrim
 - Tetracycline
- ASA & NSAIDs
 - Premature closure of ductus
 - Decrease platelet aggregation
- "OK"
 - PCN, Amoxicillin, Ampicillin, Clindamycin, Erythromycin
 - Antihypertensives (not ACEI)
 - Tylenol
 - TB meds/antivirals
 - Heparin
 - Antiemetics
 - Diclegis, Dramamine, Phenergan, Zofran (Cat C)
 - Vaccines
 - Tdap
 - Flu
 - Hep B Series

36

“MOTHERTOBABY” CALIFORNIA

- Teratogen Hotline MotherToBaby California
- Goal – promote healthy pregnancies and reduce teratogenic risks
 - Education and research focus
- I-800-626-6847
- ctispregnancy@ucsd.edu

<http://www.mothersbabyca.org/about>

37

Risk Table for Chromosomal Abnormalities

Population based on maternal age at term

Maternal Age	Risk for Trisomy 21 ^{1,2}	Risk for Trisomy 18 ^{1,2}
20	1:1,140	1:4430
21	1:1,120	1:4200
22	1:1,100	1:4020
23	1:1000	1:4250
24	1:1000	1:4150
25	1:1030	1:4020
26	1:950	1:3900
27	1:840	1:3600
28	1:800	1:3420
29	1:810	1:3140
30	1:720	1:2820
31	1:630	1:2450
32	1:540	1:2050
33	1:440	1:1700
34	1:350	1:1310
35	1:272	1:900
36	1:200	1:600
37	1:153	1:400
38	1:114	1:444
39	1:85	1:333
40	1:66	1:250
41	1:51	1:200
42	1:40	1:160
43	1:30	1:120
44	1:20	1:110
45	1:12	1:90
46	1:8	1:84
47	1:6	1:87
48	1:5	1:82
49	1:4	1:78
50	1:3	1:76

38

DEMOGRAPHIC DATA: AGE ≥ 35 YR

- Age ≥ 35 years
- Anomalies
- Hypertension disorders
- Diabetes
- Growth issues
 - IUGR
 - Macrosomia
- Placental abnormalities
- Preterm Labor
- Higher C-section rates
- Maternal and infant mortality

39

DEMOGRAPHIC DATA:
AGE -TEENS

Teenagers

- Psychosocial risks
- > # of STIs
- Nutritional deficiencies
- Preeclampsia
- Postpartum Hemorrhage (PPH)

DEMOGRAPHIC DATA: RACE

- Sickle Cell
 - African American
 - East Indian
 - Middle Eastern
 - Autosomal Recessive
- Glucose-6-dehydrogenase deficiency (G6PD)
 - X-linked Recessive
 - African American/Asian
- Thalassemia
 - Mediterranean
 - Greek
 - Italian
- Tay Sachs
 - Ashkenazi Jews
 - French Canadians
 - Cajun

SUBJECTIVE DATA "HER STORY"

- General medical history
 - Personal hx
 - Family hx
 - Menstrual hx
 - Obstetrical hx
 - Review of symptoms since LMP

SUBJECTIVE: GENERAL MED HX QUESTIONS

- Cardiovascular
- Lung
- GI
- Renal
- Endocrine
- Multiples
- Malignancies
- Reproductive problems
- STIs & other infections
- Neurological
- Blood disorders
- Hx blood transfusion
- Surgeries/trauma
- Hospitalization
- Abuse
- Social hx

43

SUBJECTIVE: GENERAL MEDICAL HISTORY

- Cardiovascular
 - Preeclampsia risk
- Gastrointestinal
 - Hepatitis B & C
 - Bypass surgery
- Renal
 - Recurrent UTIs
 - Pyelonephritis
- Reproductive tract
 - Cone bx, cervical trauma (TABs)
 - Uterine anomalies (bicornuate)
- Endocrine: Diabetes
 - Diet & Exercise
 - Type of DM (GDM A-1, GDM A-2, Type 1, Type 2)
 - Rx (po versus SQ)
 - Diabetic Educators
 - Risks
 - HTN disorders
 - Macrosomia leading to shoulder dystocia or c-section
- Endocrine: Thyroid – Hypothyroid or Hypert thyroid – Rx?

44

SUBJECTIVE: GENERAL MEDICAL HISTORY

- Neurological
 - Headaches
 - Psychiatric
- Blood disorders
 - Thalassemia
 - G6PD
 - Sickle Cell
 - Physiologic anemia
- Hospitalizations
 - Blood transfusions
 - Hemolytic antibodies
 - "Kell kills, Duffy dies"
 - HIV: 1978-1985
 - General anesthesia
- Habits
 - ETOH, tobacco, street drugs

45

**SUBJECTIVE: GENERAL MEDICAL HISTORY
OTHER INFECTIONS**

- Rubella
 - 1st trim: congenital rubella syndrome
- Rubeola
 - No anomalies
 - SABs, PTL, SGA
- Toxoplasmosis
 - Neuro / eye probs
- CMV
 - "blueberry muffin syndrome"
- GBS disease in prior newborn
- Varicella
 - 50% pneumonia mortality
- Parvovirus (5ths Disease)
 - SABs, hydrops
- HSV
- HIV
- Influenza
- Abuse
- ... "Anything else we need to know?"

46

**OBJECTIVE DATA
"OUR STORY"**

- Laboratory Data
- Initial physical exam
 - OB focused general exam
 - Cervix
 - Uterus
 - Pelvis
- Vital signs and BMI

47


LABORATORY DATA (INITIAL PRENATAL LABS)

- Routine:**
 - Type/ Rh/ ABS
 - CBC
 - Rubella
 - VDR/L/RPR
 - Hepatitis B & C
 - HIV
 - UA and culture
 - GC/CT
- PRN:**
 - Hgb A1-C
 - Urine toxicology
 - Pap smear
 - PPD/Quantiferon Gold
 - Vit D/Lead
 - Varicella IgG
 - Offer:
 - 1st Tri Screen/NT
 - NIPT
 - Recessive Carrier Screening

48

OBESITY IN PREGNANCY

- Elevated BMI Risks:
 - HTN disorders, diabetes
- Macrosomia
 - Longer labor
 - Shoulder dystocia
- C-section delivery
 - PostPartum Hemorrhage, Infection
- Neonatal and childhood risks
 - Increased rates of NTD, cleft lip/palate
 - Hypoglycemia
 - Childhood obesity
 - DM, HTN



49

PRENATAL VISIT - ASSESSMENT & PLAN OF CARE

<p>Assessment Example</p> <ol style="list-style-type: none"> IUP at 32 weeks, size consistent with dates. GDM-A1 well controlled 	<p>Plan of Care Example</p> <ol style="list-style-type: none"> Diagnostic (labs, etc) Therapeutic (Rx, PT, etc) Education Follow-up
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50

FOLLOW-UP PRENATAL CARE APPOINTMENTS

PART III

51

PRENATAL CARE VISITS

- Each visit
 - Vitals, Weight, Urine prn
 - Fundal height
 - Leopold's Maneuver (>28 weeks)
 - FHR (doppler if ~ >10 weeks)
 - Fetal movement (> 20 weeks, > 28 weeks fetal movement counting)
 - Education
 - Rule out complications

52

LABORATORY DATA: FOLLOW UP PRENATAL VISITS

- ~ 15 – 20 weeks
 - Offer Quad Screen (aka AFP)
- ~ 26 - 28 weeks
 - GTT (glucose tolerance test)
 - CBC
- ~ 35 - 36 weeks
 - GBS culture
- PRN labs throughout
 - Colposcopy
 - Repeat ABS if Rh negative
 - GC/CT
 - EKG/ECHO
 - Toxicology
 - Hemoglobin Electrophoresis

53

EDUCATION: EACH TRIMESTER

- Anatomy & physiology
- Fetal development
- Nutrition & weight gain parameters
- Discomforts & relief measures
- Trimester specific labs
- Danger signs

54

1ST TRIMESTER EDUCATION

- EDC calculation
- Safe medications and teratogens
- Exercise
- OB visits
- How to access care
- 1st trimester screening
- Danger Signs
- Severe vomiting
- Vaginal bleeding
- Severe abdominal pain/cramping
- S/S of UTI

55

2ND TRIMESTER EDUCATION

- Childbirth education classes
 - Intrapartum, Postpartum, Breastfeeding
- Breast vs Bottle feeding
- Pediatrician
- Circumcision
- 2nd trimester QUAD screen
- Danger signs:
 - Vaginal bleeding
 - S/S preterm labor
 - S/S of UTI
 - High risk factors as appropriate

56

3RD TRIMESTER EDUCATION

- Birth plan
- L&D procedures
- S/S labor
- Fetal movement counting
- Pain relief options
- Antenatal testing as indicated (NST/AFI)
- Birth control
- Postpartum depression
- Danger signs:
 - Vaginal bleeding
 - S/S preterm labor
 - S/S preeclampsia
 - Decreased FM

57

**POSTPARTUM DEPRESSION:
SAN DIEGO POSTPARTUM HEALTH ALLIANCE**

- Services
 - Raise awareness
 - Provide support
 - Treatment referrals
- Crisis "Hotline"
 - Behavioral crisis
 - 24/7 counselors
 - 1-800-479-3339
 - "Warmline"
 - 619-254-0023
 - 24/7 return call

58



HEALTHY MOM & HEALTHY BABY
