태아통합컨퍼런스

2019.09.16 (월)

삼성서울병원
소아청소년과
Fellow. 한예슬

Postnatal management of UTD

1. Kidney US 대상
   - 산전 초음파 시행 후 Postnatal US 시행은 산부인과에서 신생아파트로 **consult 작성된 환자의 경우만** 출생 후 US 시행

2. Initial postnatal US
   - 적어도 **72시간 이후** 시행한 후 Nephro consult 작성.
   - 입원기간 내 US 시행하지 못한 경우 퇴원 시 US 예약(한달 이내) 및 US 시행 후 1주일 뒤 Nephro 외래 예약

3. F/U schedule
   - US 결과(UTD classification) 에 따라 Nephro part에서 외래 f/u 일정 결정
   - US에서 UTD classification이 기재되어 있지 않은 pyelectasia(APD 5mm이상)의 경우 3개월 뒤 F/U US 및 1주일 뒤 Nephro 외래

예외

- Posterior urethral valve
- unexplained oligohydramnios
- severe bilateral hydronephrosis (APD 10mm 이상)
- duplicated kidney

-> 생후 72hr 이내라도 입원기간 내 US 시행 후 URO consult

논의사항

- **Prenatal, postnatal pelviectasia/hydronephrosis의 정의?**

- **Postnatal initial w/u의 시기?**
  - Initial w/u이 입원 기간에 진행되지 못하는 경우(공휴일, 주말, duration…. Etc)
    1) 산모의 퇴원 delay
    2) 생후 48hr-72hr이내 검사 시행 -> underestimated, 불필요한 추가 검사
    3) 퇴원 후 외래에서 검사 시행 -> 초음파검사 예약 어려움
       검사시행 후 결과확인위해 외래 재방문

- **US 시행 후 정식 reading?**
  - 없을 경우 verbal reading에 따라 진행
  - 검사소견 이상 없어 consult 없이 퇴원시 Neo외래에서 판독 확인
    -> reading 변경이 있을 경우 빠른시일 내 Nephro/URO 외래 f/u

CASE 최O랑/F (42892857)

임신 29주경에 진단된

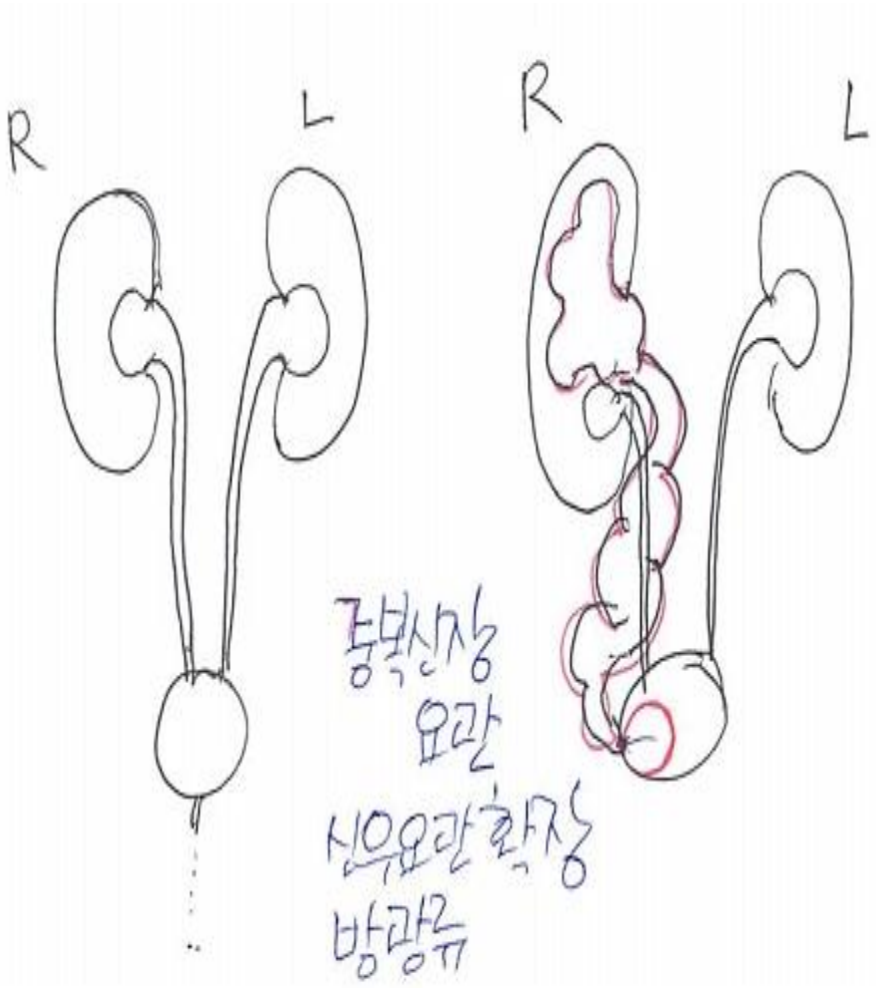
Rt. renal duplication with hydronephroureterosis and ureterocele

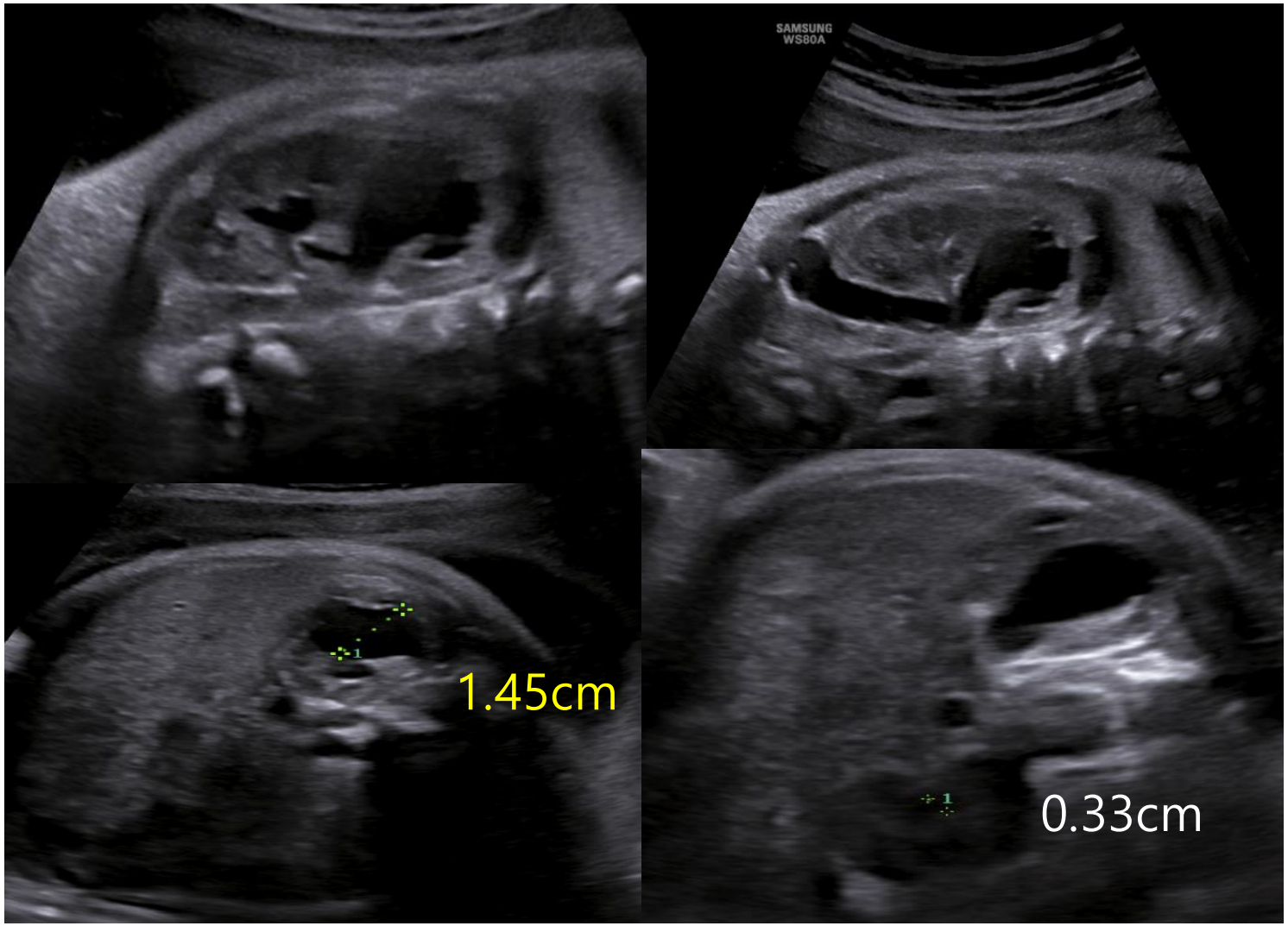
(분만 후 진단명: Rt. renal duplication)

Patient information

- Date of Birth : 2019.08.13, 00:35
- Inborn, IVF-ET#8, 1st baby, Vaginal delivery
- Gestational age : 40+4weeks
- Birth weight : 3270 (25-50p)
- Height : 50cm (50-75p)
- Head circumference : 34.5cm (75p)
- Apgar score : 9/10

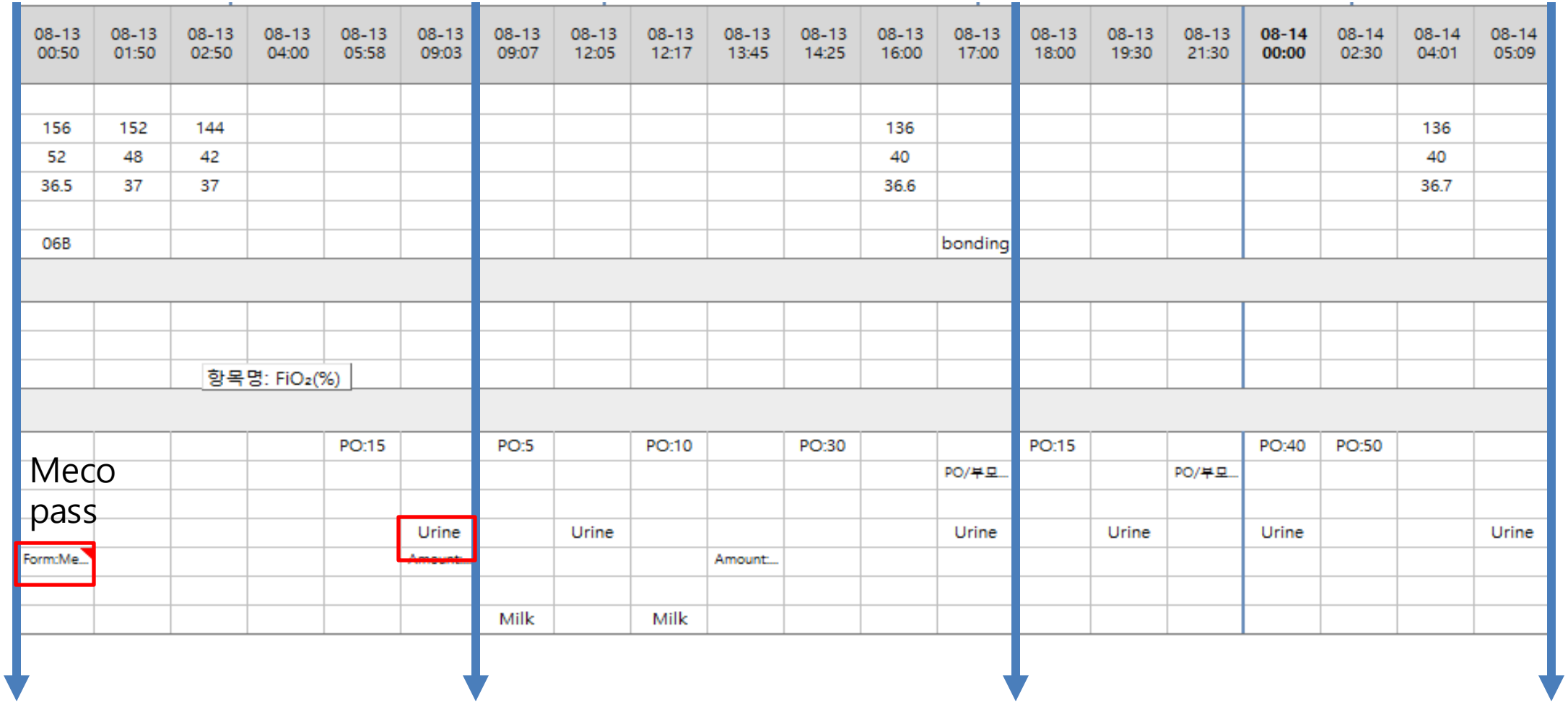
Fetal Last US(2019-07-24, GA 37+5wks)





Physical examination

- **General Appearance**
  - Active
- **HEENT**
  - Caput succedaneum (+)
  - Nasal flaring (-)
  - moaning (-)
- **Chest**
  - Chest retraction (-)
  - Regular heart beat
  - Murmur (-)
- **Abdomen**
  - Soft and distended (-)
  - Palpable mass (-)
- **External genitalia**
  - female
- **Extremities**
  - Hip dislocation (-)
  - Mongolian spot (+), hip area



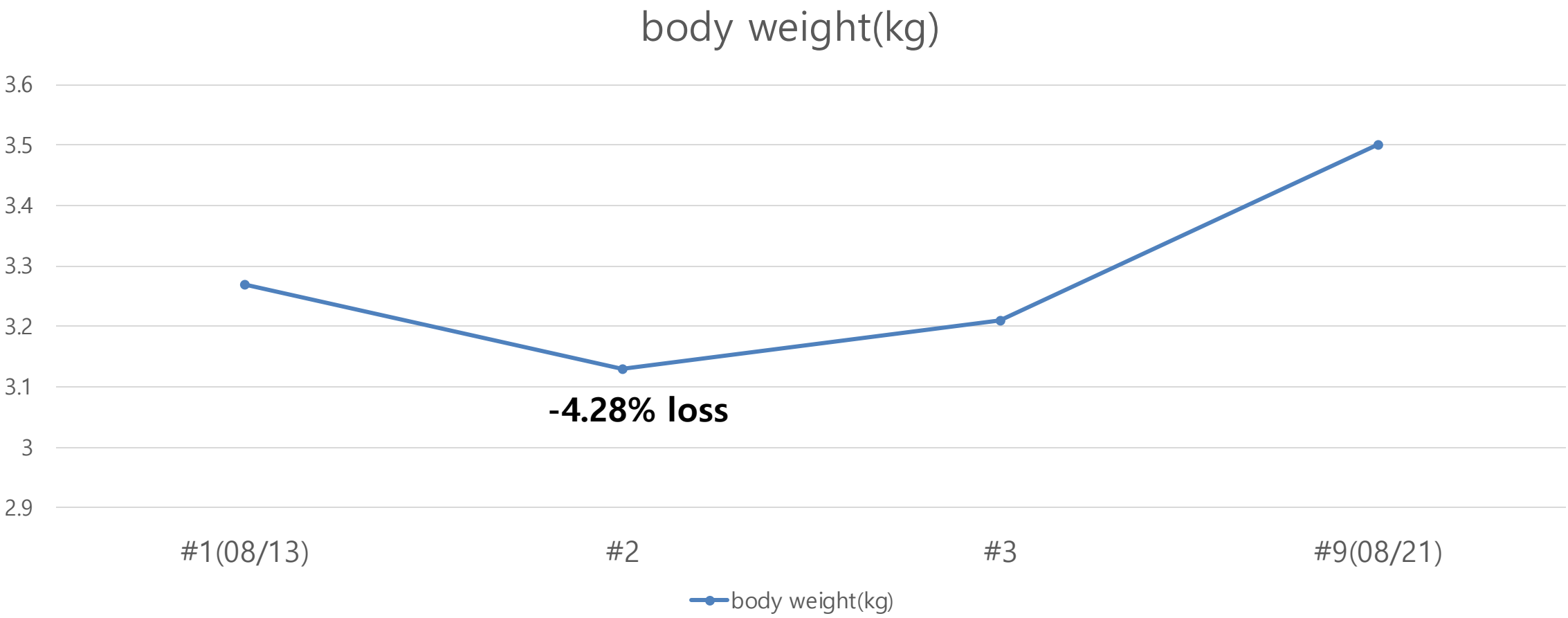
08-13 00:35분
출생

08-13 09:03분
Urination pass

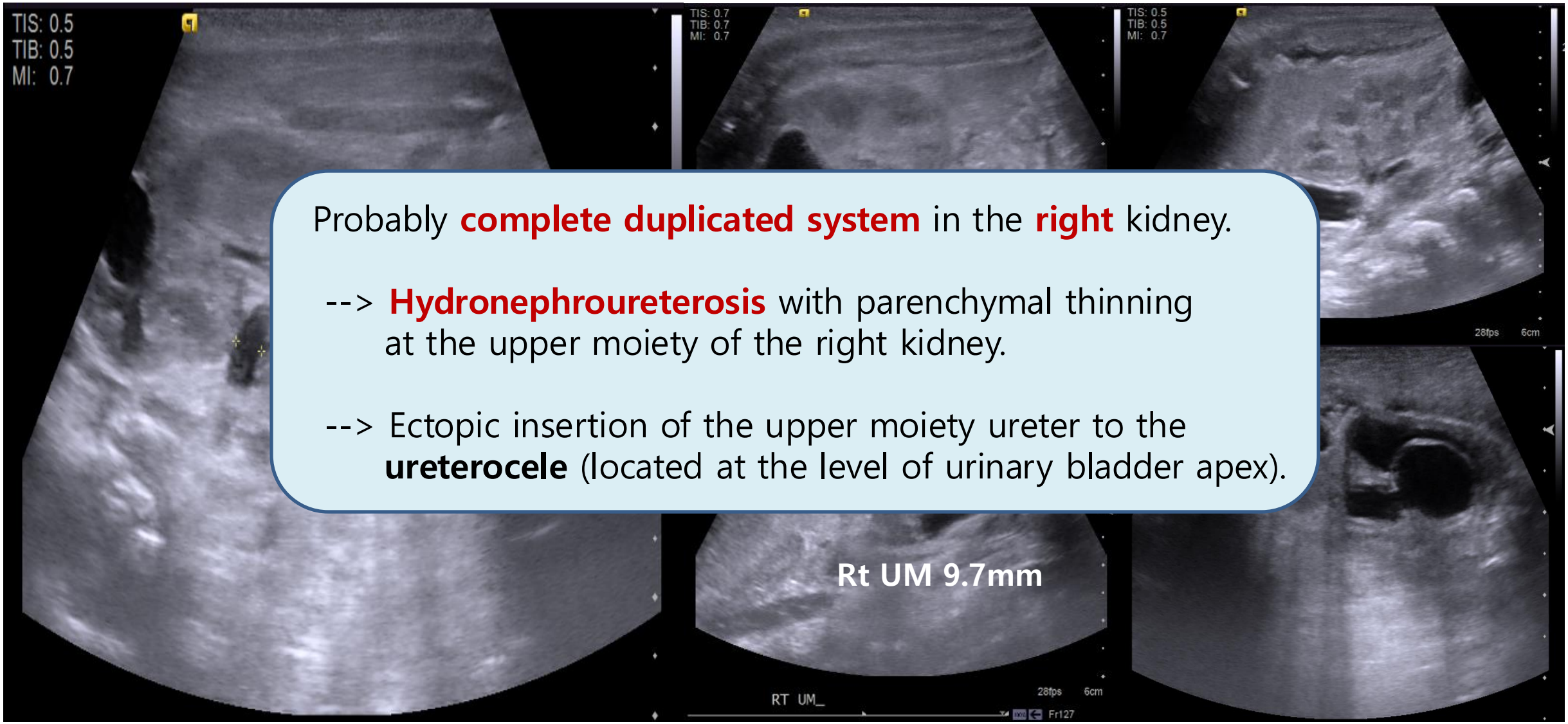
08-13 17:00분
첫 bonding

08-15 10:38분
퇴원

58hr 3min


body weight(kg)
3.6
3.5
3.4
3.3
3.2
3.1
3
2.9
-4.28% loss
#1(08/13)
#2
#3
#9(08/21)
body weight(kg)

2019-08-20(#8) LGPK US



Probably **complete duplicated system** in the **right** kidney.

--> **Hydronephroureterosis** with parenchymal thinning at the upper moiety of the right kidney.

--> Ectopic insertion of the upper moiety ureter to the **ureterocele** (located at the level of urinary bladder apex).

OPD f/u (URO, Nephro)

1. 현재까지는 소변 배출 원활한 상태로 기능 잘 유지됨.
2. 요로 감염의 위험성은 높은 상태로 증상 없는 발열시에는 요검사 필요함.
3. 더 큰 후에는 배뇨 관련 증상 발생할 가능성, 이후에는 신장기능 감소할 가능성이 있어 주기적인 추적 관찰.
4. 3개월 뒤(11월) Kidney&bladder US 시행 및 URO 외래

CASE 2　김O현/F (42766248)

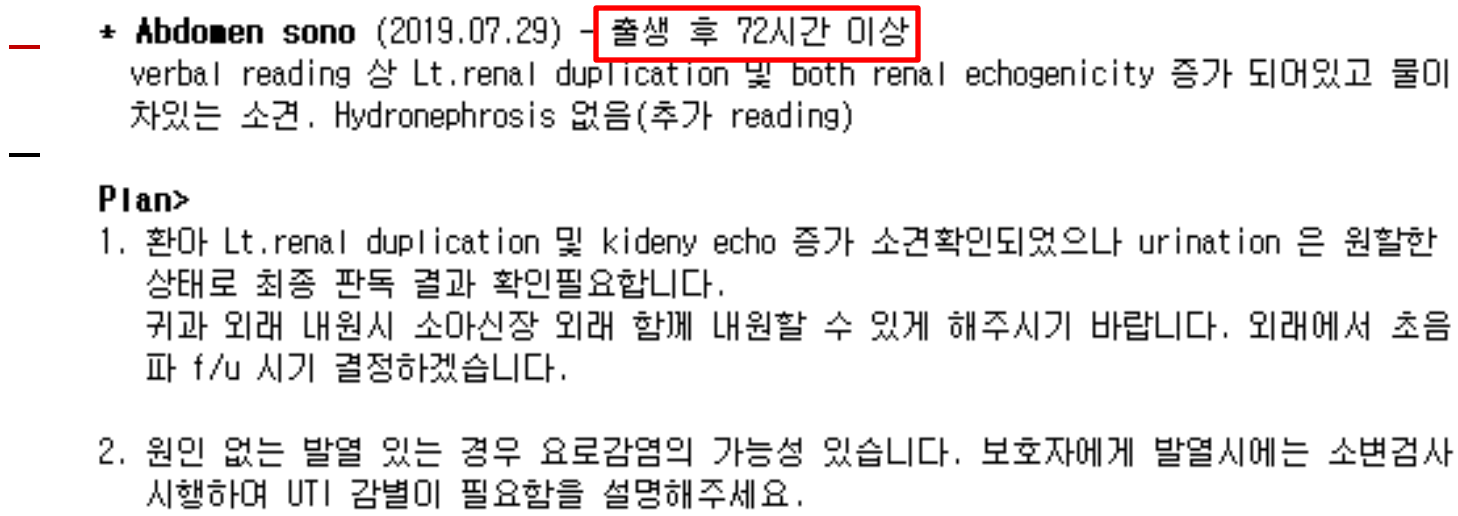
임신 20주경에 진단된

r/o Lt renal duplication(타병원)

(분만 후 진단명: Lt. incomplete duplicated kidney without hydronephrosis)

Patient information

- Date of Birth : 2019.07.25, 12:40
- 34+1wks, 2040g(AGA), Em C/sec d/t placenta previa totalis
- AS 9/9, resuscitation없이 NICU 입실 -> 07.27 Nursery bonding
- LGPK US(2019-07-29, #5)



*** Abdomen sono** (2019.07.29) - 출생 후 72시간 이상
verbal reading 상 Lt.renal duplication 및 both renal echogenicity 증가 되어있고 물이 차있는 소견. Hydronephrosis 없음(추가 reading)

Plan>
1. 환아 Lt.renal duplication 및 kideny echo 증가 소견확인되었으나 urination 은 원할한 상태로 최종 판독 결과 확인필요합니다.
귀과 외래 내원시 소아신장 외래 함께 내원할 수 있게 해주시기 바랍니다. 외래에서 초음파 f/u 시기 결정하겠습니다.

2. 원인 없는 발열 있는 경우 요로감염의 가능성 있습니다. 보호자에게 발열시에는 소변검사 시행하여 UTI 감별이 필요함을 설명해주세요.

과 똑같이 키우되

6개월뒤 US f/u

CASE 3　김O안/M (42608339)

임신 31주경에 진단된

bilateral pyelectasis

(분만 후 진단명: both pelviectasia)

Patient information

- Date of Birth : 2019.07.02, 19:52 -> Dischage : 2019.07.04 11:00
- 38+5weeks, 3430g, V/D, AS 9/10
- Fetal US
  - (06/11,35+5wks) Rt 8.8-9.9mm, Lt 4.6-6.5mm ->(06/26) Rt 9.2-10.0mm
- LGPK US(2019-07-24, **#23**)
  - Rt. Intrarenal 5mm/extrarenal 9mm, Lt 8.6mm
  - 2개월 뒤 US f/u + Nephro OPD f/u

Case 4 박O안/M (42876884)

- 41+0weeks, 3890g, V/D, AS 9/10
- Fetal US
  - (28wks) Rt 4.9/Lt 11mm (unilateral)
  - (34wks) Rt 3.9/Lt 13mm
  - (38wks) 4.9/15.6mm

- LGPK US(2019-08-12, **#4**)
  - Dilatation of left renal pelvis (up to 1.6 cm) and suspicious parenchymal thinning.

    -> R/O UPJ obstruction.
  - 1개월 뒤 US f/u + Nephro/URO f/u

Case 5 장O솔/M (42683813)

- 39+1wks, 3060g, V/D, AS 9/10
- Fetal US
  - (23+6wks) Rt 5.2/Lt 6.5mm
  - (26+6wks) Rt 5.7/Lt 7.2mm (bilateral)
  - (39wks) 5.5mm, 8mm

- LGPK US(2019-07-17, **#4**)
  - Lt pelvocalyx dilatation with minimal parenchymal thinning

    -> r/o Lt UPJ obstruction

    -> 2주뒤 f/u, stationary state.

    (both hydronephrosis)
- 2개월 뒤 f/u + 요로감염시 역류검사

CAKUT
(CONGENITAL ABNORMALIES OF THE KIDNEY AND URINARY TRACT)

URINARY TRACT DILATATION (UTD)

Original article

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The Prenatal and Postnatal Incidence of Congenital Anomalies of the Kidneys and Urinary Tract (CAKUT) Detected by Ultrasound

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Purpose: Congenital anomalies of the kidneys and urinary tract (CAKUT) are the most common anomalies identified in newborns. This study aims to demonstrate the prevalence of CAKUT including hydronephrosis diagnosed by antenatal and postnatal ultrasound over a five-year period.

Methods: The records of births between May 1st, 2009 and April 30th, 2014 at our hospital were collected. The number of infants who underwent renal ultrasound after birth for the detection of CAKUT was counted. The incidence of each type of CAKUT such as hydronephrosis, size abnormality, horseshoe kidney, and Multicystic dysplastic kidney (MCDK) was retrospectively evaluated for antenatal screening and postnatal follow-up examination.

Results: During the study period, 33,276 infants were born and 521 neonates underwent postnatal renal ultrasound. 183 cases of CAKUT were detected prenatally and 140 postnatally using ultrasonographic examinations at the following time: (i) 3-7 days postnatally in 123 newborns (87.9%), (ii) during 1-3 months in 11 newborns (7.9%), and (iii) later than 3 months in 6 newborns (4.3%). Among diagnosed CAKUT, hydronephrosis was the most common anomaly with 113 newborns diagnosed prenatally and 46 postnatally. Duplex kidney was the second most common anomaly followed by horseshoe kidney, simple cysts in the kidney and so on.

Conclusion: The detection of CAKUT is an important part of the prenatal ultrasound. This study analyzed the prevalence of CAKUT detected on prenatal screening and compared the results to those detected postnatally. Prenatal ultrasound screening fulfills the needs of postnatal examinations and therefore, both antenatal and postnatal sonographic investigations are of vital importance for diagnosis of renal and urinary tract anomalies.

Key words: CAKUT, Hydronephrosis, Ultrasound examination

Table 1. Types and Incidence of Congenital Anomalies of the Kidney and Urinary Tract Detected by Prenatal and Postnatal Ultrasonography

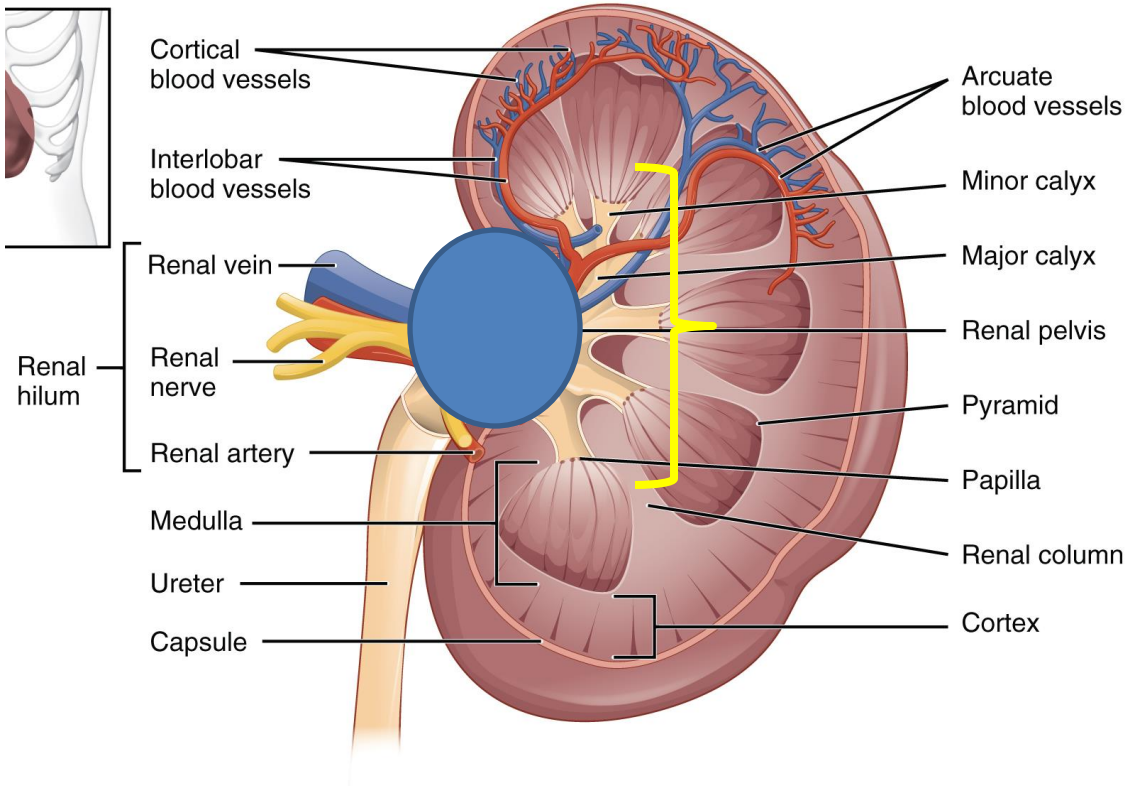
	Prenatal N=183 (%)	Male: Female	Postnatal N=140 (%)	Male: Female
Hydronephrosis	113 (61.7%)	94:19	46 (32.9%)	40:6
Duplicated kidney	39 (21.3%)	23:16	35 (25.0%)	17:18
Horseshoe kidney	9 (4.9%)	7:2	13 (9.3%)	11:2
Simple cysts	9 (4.9%)	5:4	9 (6.4%)	4:5
Size abnormality	7 (3.8%)	5:2	18 (12.9%)	12 :6
Rotational anomaly	4 (2.2%)	4:0	2 (1.4%)	1:1
Renal agenesis	3 (1.6%)	3:0	4 (2.9%)	3:1
MCDK	1 (0.5%)	1:0	4 (2.9%)	1:3
Ectopic kidney	1 (0.5%)	0:1	1 (0.7%)	0:1
Hypoplastic kidney	0	0	1 (0.7%)	1:0
VUR	0	0	4 (2.9%)	4:0

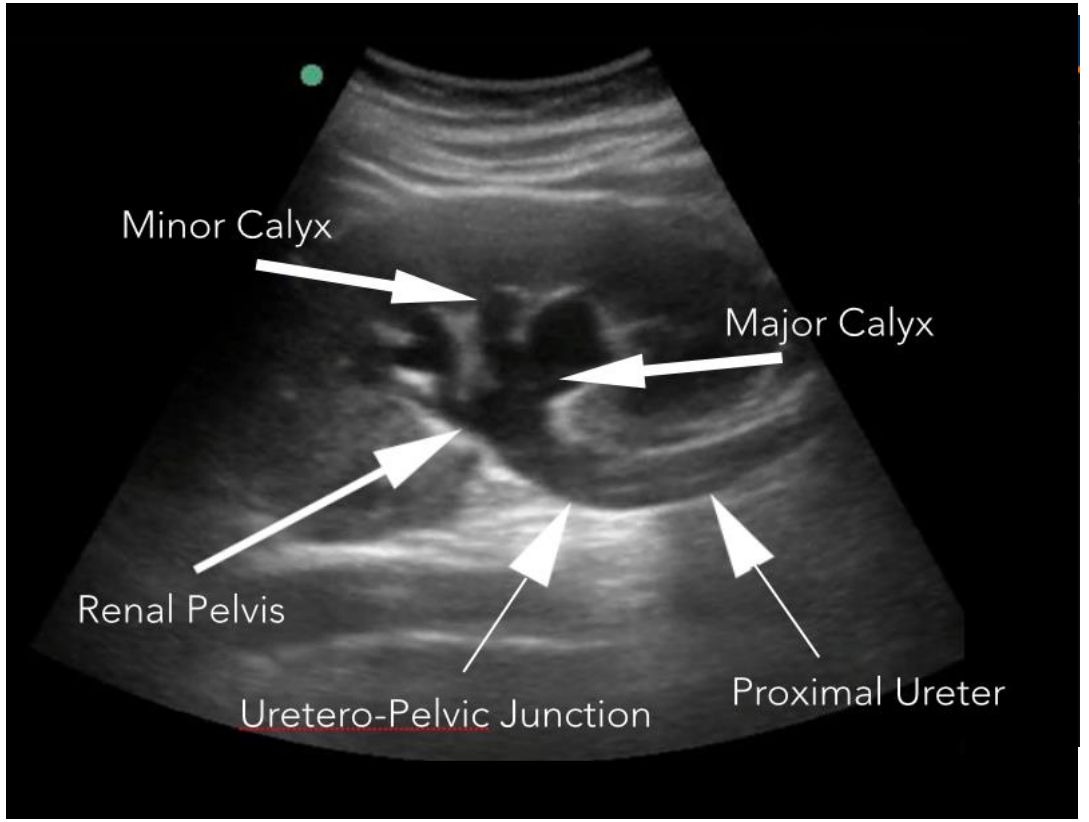
Abbreviations: MCDK, multicystic dysplastic kidney; VUR, vesicoureteral reflux.

Table 2. Characteristics of Hydronephrosis Detected by Prenatal and Postnatal Ultrasonography

	Prenatal N=113 (%)	Postnatal N=46 (%)	Calyectasis
Affected site			
Right	24 (21.2%)	8 (17.4%)	
Left	65 (57.5%)	34 (73.9%)	
Bilateral	24 (21.2%)	4 (8.7%)	
Grading			
7≤ <10 mm	82 (72.6%)	32 (69.6%)	5 (10.9%)
10≤ <15 mm	28 (24.8%)	12 (26.1%)	7 (15.2%)
≥15 mm	3 (2.7%)	2 (4.3%)	1 (2.2%)

- **Pelviectasis**: mild enlargement of the pelvis of the renal pelvis
- **Hydronephrosis**: dilatation of the renal pelvis and calices





Etiology	Incidence	Prenatal US findings
Transient/physiologic	**50-70%**	Isolated hydronephrosis, most **often mild**
Ureteropelvic junction (UPJ) obstruction	**10-30%**	**Moderately (10-15mm) or severely (>15mm)** dilated renal pelvis in the absence of any dilation of ureter or bladder
Vesicoureteral reflux (VUR)	**10-40%**	**Variation** (in general, there are no specific US findings that are pathonomic)
Multicystic dysplastic kidney (MCDK)	2-5%	Varying sizes of randomly located renal cysts
Posterior urethral valves	1-5%	A combination of the following: posterior urethral dilation, a full bladder with thickened wall, oligo- or anhydramnios, hydronephrosis, increased renal echogenicity
Ureterocele	1-3%	A cystic mass in the bladder, and hydroureteronephrosis to the level of the obstructing ureterocele
Less common etiology: ectopic ureter, urethral atresia, prune-belly syndrome, polycystic kidney disease, and renal cysts	<1%	

World J Clin Urol. 2014

논의 1.

- Prenatal, postnatal pelviectasia/hydronephrosis의 정의?

Current status

1) Terminology
(hydronephrosis, pyelectasis, pelviectasis, uronephrosis, UT fullness, pelvic fullness..)

2) No unified classification of UT dilatation in pre & postnatal period

3) UT dilatation fluctuation

→ **Urinary Tract Dilatation (UTD) Classification**

SAMSUNG 삼성서울병원 모아집중치료센터

로그인

모아집중치료센터 정보마당

정보마당

질환정보 ›

- 선천성심기형
- 위장관 질환
- 복벽질환
- 태아의 흉곽에 생기는 질환
- 중추신경계 질환
- **비뇨생식기계질환**
- 구순열/구개열
- 기타

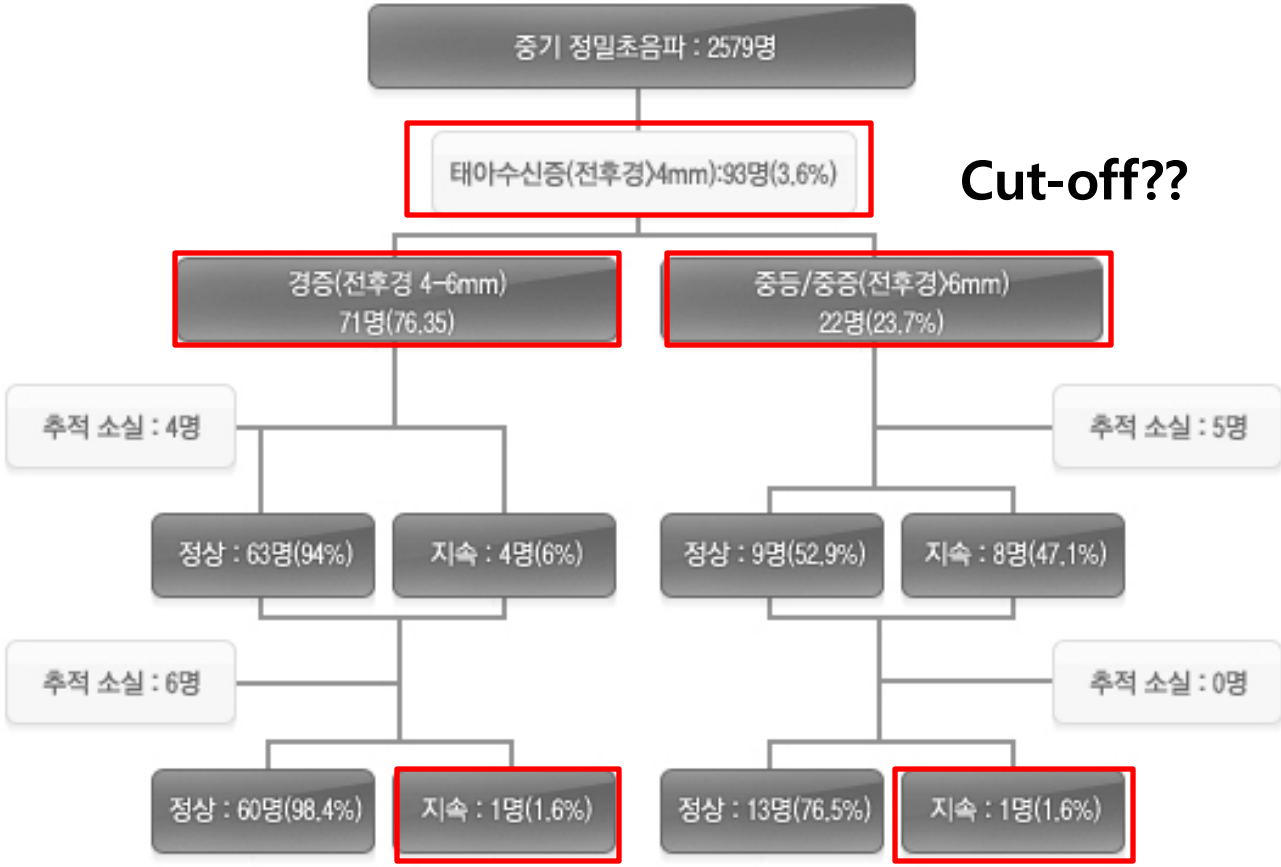
태아치료

신우확장증

신우확장증 | 다낭성 신

신우확장증 (Renal

경한 정도의 신우 확장증 (
빈도로 발생한다. 이것은 요
와 신우가 늘어난 상태를 말
원인으로 가장 흔한 것은 상
(ureteropelvic junction
방광요관역류(vesicoure
우확장증의 경우, 다수에서
파가 널리 이용되어 태아 신
확장증과 병적인 신우확장
등도 이상으로 분류할 수 있
삼성서울병원 산부인과에서
매우 흔하게 관찰되었으며
으며 출생 후에도 일부분에
으로 감소하거나 요로 폐색



Cut-off??

삼성서울병원 2007년 1월~ 2008년 12월까지 2579명의 산모 중 93명(3.6%)이 임신 20-22주
산전 초음파에서 태아 수신증 진단 받아 추적 관찰 결과,
임신 37주 이후 5명의 태아에서 초음파상 신우확장증이 지속됨

Guideline 1: Diagnosis and grading of antenatal hydronephrosis

Classification of antenatal hydronephrosis, based on renal pelvic anteroposterior diameter[10]

Classification	Renal pelvic anteroposterior diameter, APD	
	Second trimester	Third trimester
Mild	4-6 mm	7-9 mm
Moderate	7-10 mm	10-15 mm
Severe	>10 mm	>15 mm

APD: Anteroposterior diameter

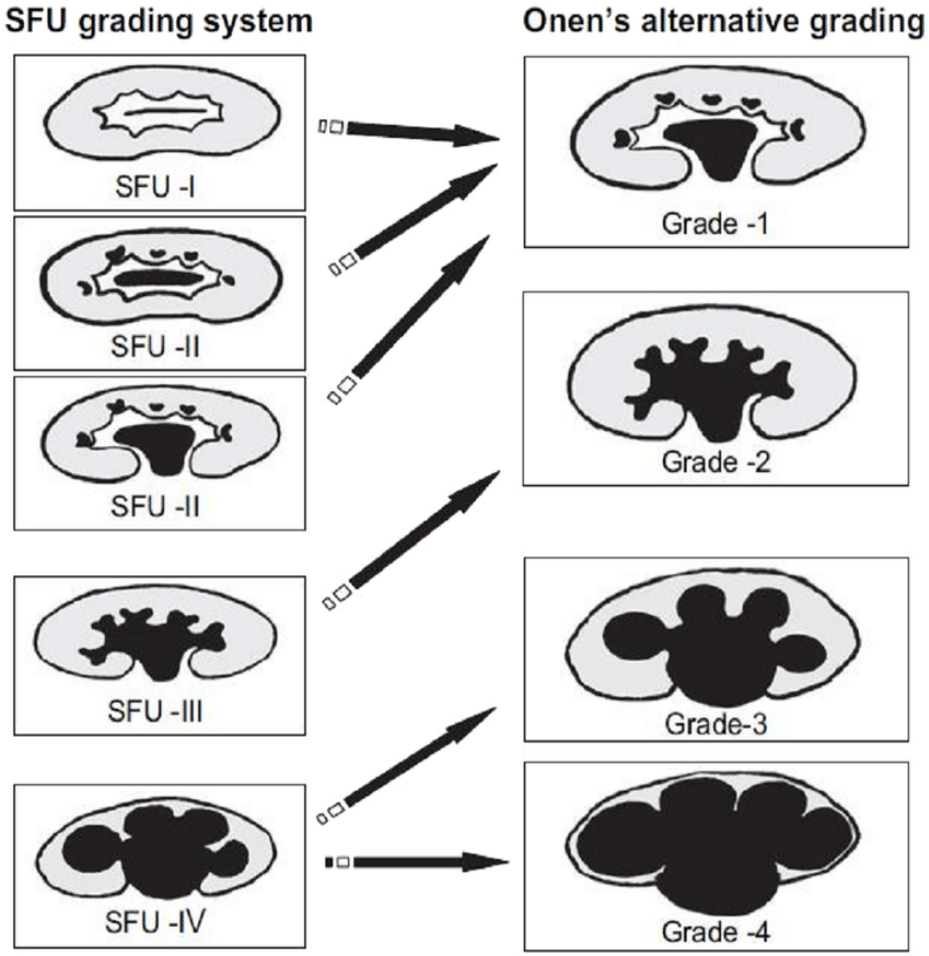
중증도에 상관없이 prenatal UTD이 관찰 되었던 경우
점차 악화 되거나 재발하는 hydronephrosis의 발생 비율 15% -> F/U 필요!

Guideline 2 : Diagnosis and grading of postnatal hydronephrosis

- Assessment of severity of postnatal hydronephrosis

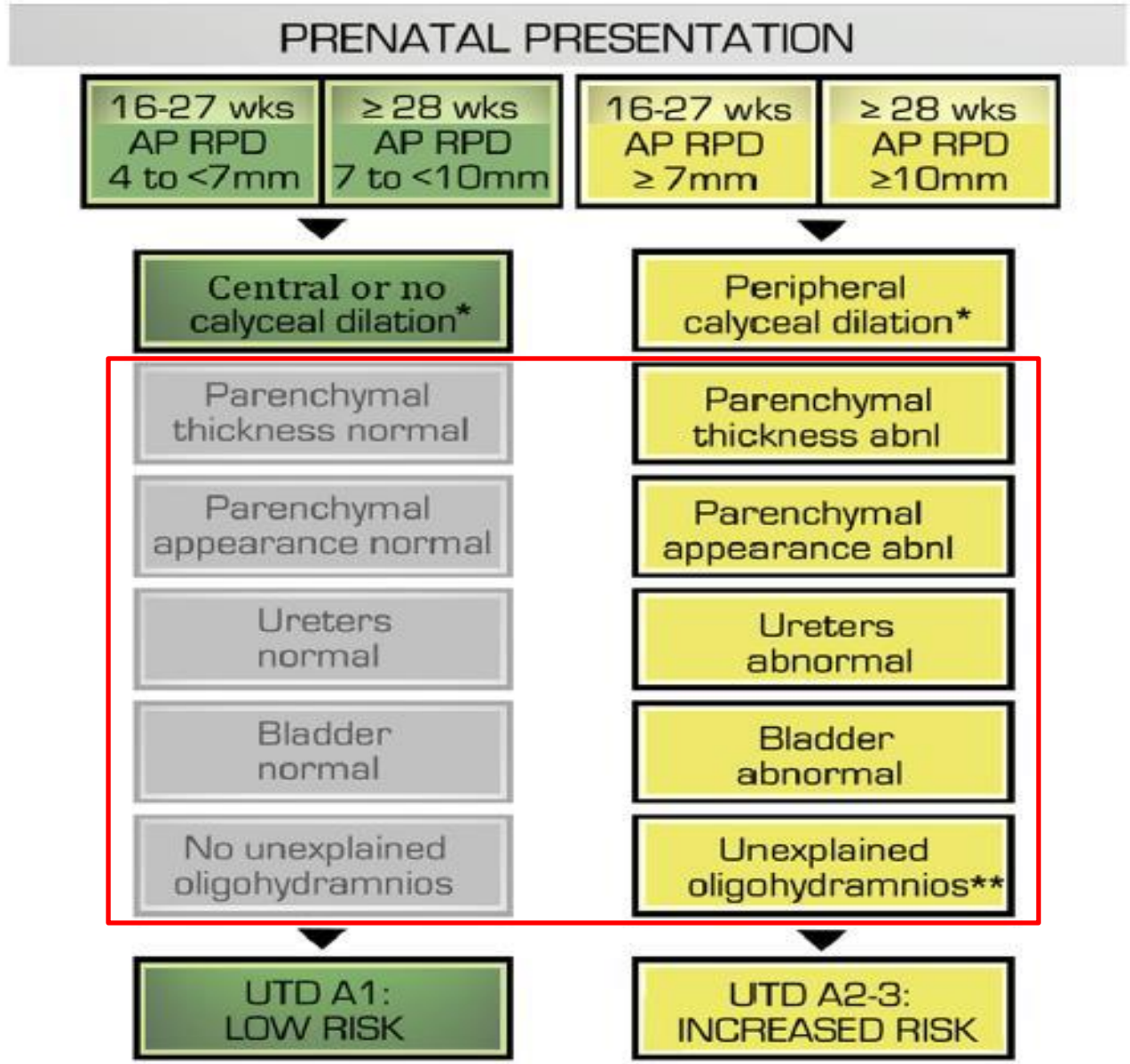
  -> SFU or anteroposterior diameter of the renal pelvis (1B).

- Ultrasonography should include
  - calyceal or ureteric dilation
  - cortical cysts
  - enhanced renal echogenicity
  - bladder wall abnormalities (2D).



Normal value for UTD classification

Ultrasound findings	Time at presentation		
	16-27 weeks	≥ 28 weeks	Postnatal (>48hr)
Anterior-Posterior Renal Pelvis Diameter(**APRPD**)	**< 4mm**	**<7mm**	**<10mm**
Calyceal dilatation			
central peripheral		No No	
Parenchymal thickness		Normal	
Parenchymal appearance		Normal	
Ureter		Normal	
Bladder		Normal	
Unexplained **oligohydramnios**		No	


PRENATAL PRESENTATION
16-27 wks AP RPD 4 to <7mm
≥ 28 wks AP RPD 7 to <10mm
16-27 wks AP RPD ≥ 7mm
≥ 28 wks AP RPD ≥10mm
Central or no calyceal dilation*
Peripheral calyceal dilation*
Parenchymal thickness normal
Parenchymal thickness abnl
Parenchymal appearance normal
Parenchymal appearance abnl
Ureters normal
Ureters abnormal
Bladder normal
Bladder abnormal
No unexplained oligohydramnios
Unexplained oligohydramnios**
UTD A1: LOW RISK
UTD A2-3: INCREASED RISK
*Central and peripheral calyceal dilation may be difficult to evaluate early in gestation
**Oligohydramnios is suspected to result from a GU cause

APRPD 10 mm to < 15 mm
and/or central calyceal dilatation

APRPD ≥ 15 mm
or peripheral calyceal dilatation

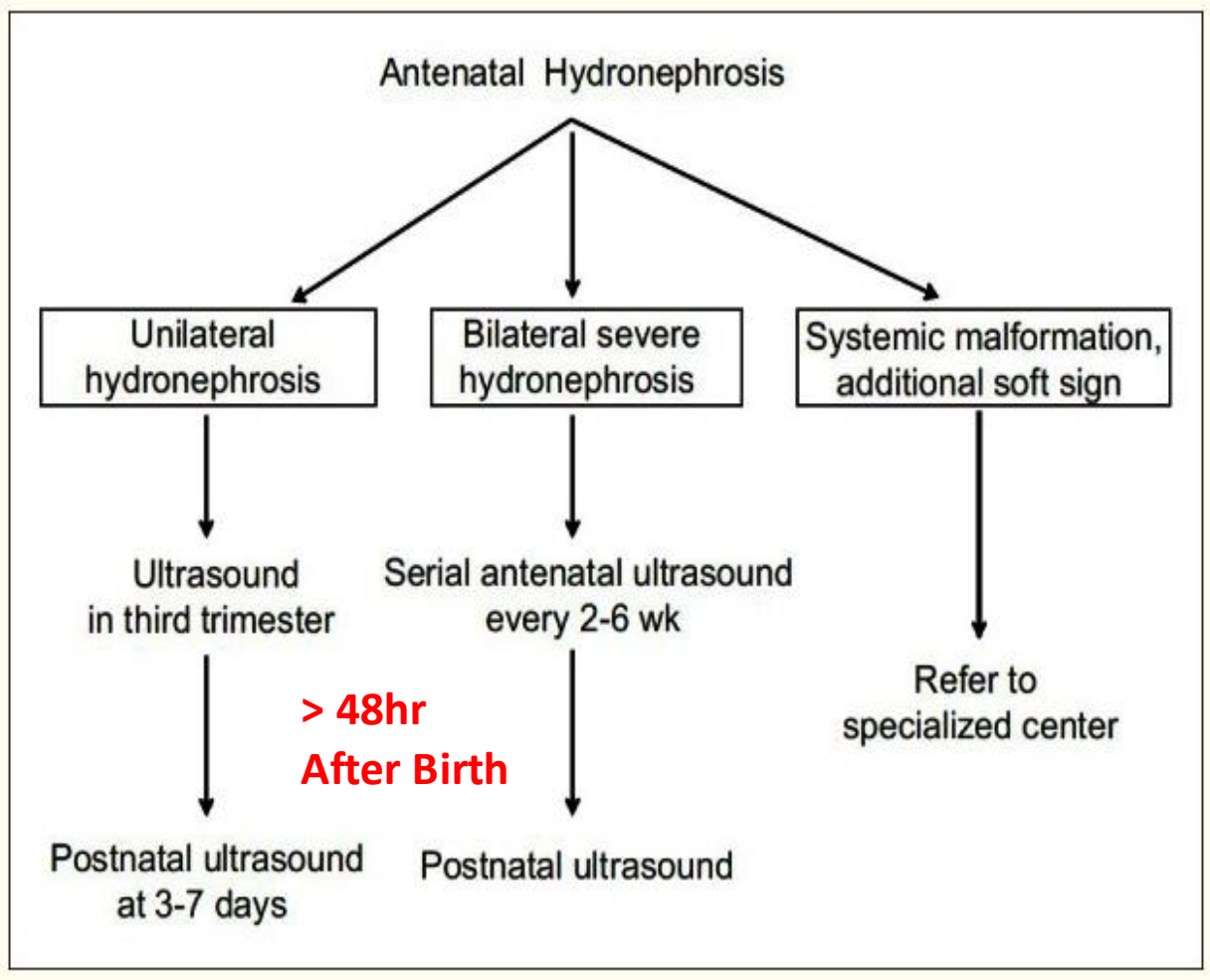
Parenchymal thinning

> 48 hours APRPD 10 to < 15mm	> 48 hours APRPD ≥ 15mm	> 48 hours APRPD ≥ 15mm
Central calyceal dilation	Peripheral calyceal dilation	Peripheral calyceal dilation
Parenchymal thickness normal	Parenchymal thickness normal	Parenchymal thickness abnl
Parenchymal appearance normal	Parenchymal appearance normal	Parenchymal appearance abnl
Ureters normal	Ureters abnormal	Ureters abnormal
Bladder normal	Bladder normal	Bladder abnormal
UTD P1: LOW RISK	UTD P2: INTERMEDIATE RISK	UTD P3: HIGH RISK

논의 2.

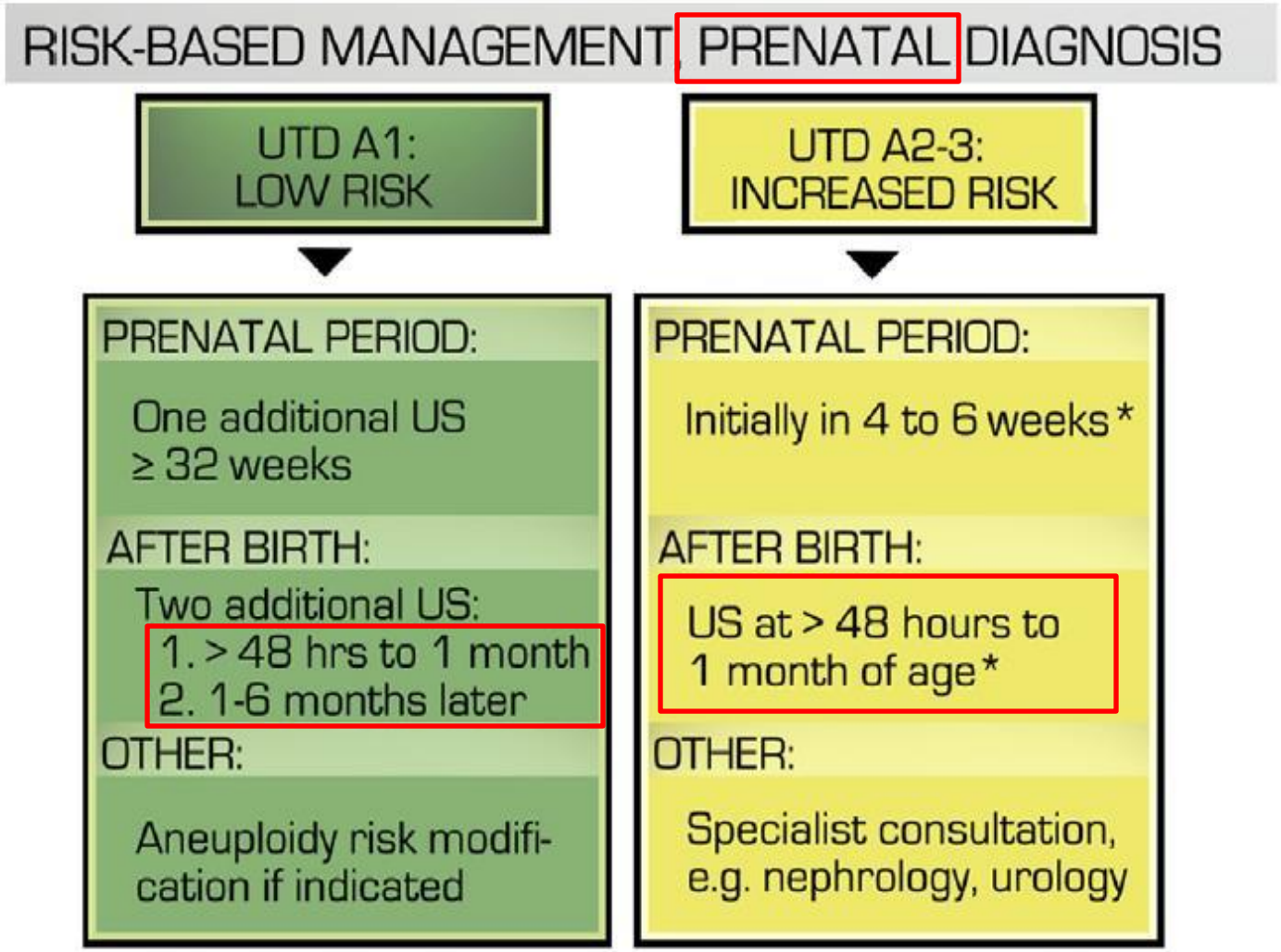
- **Postnatal initial w/u의 시기?**

Guideline 3: Timing of initial ultrasound



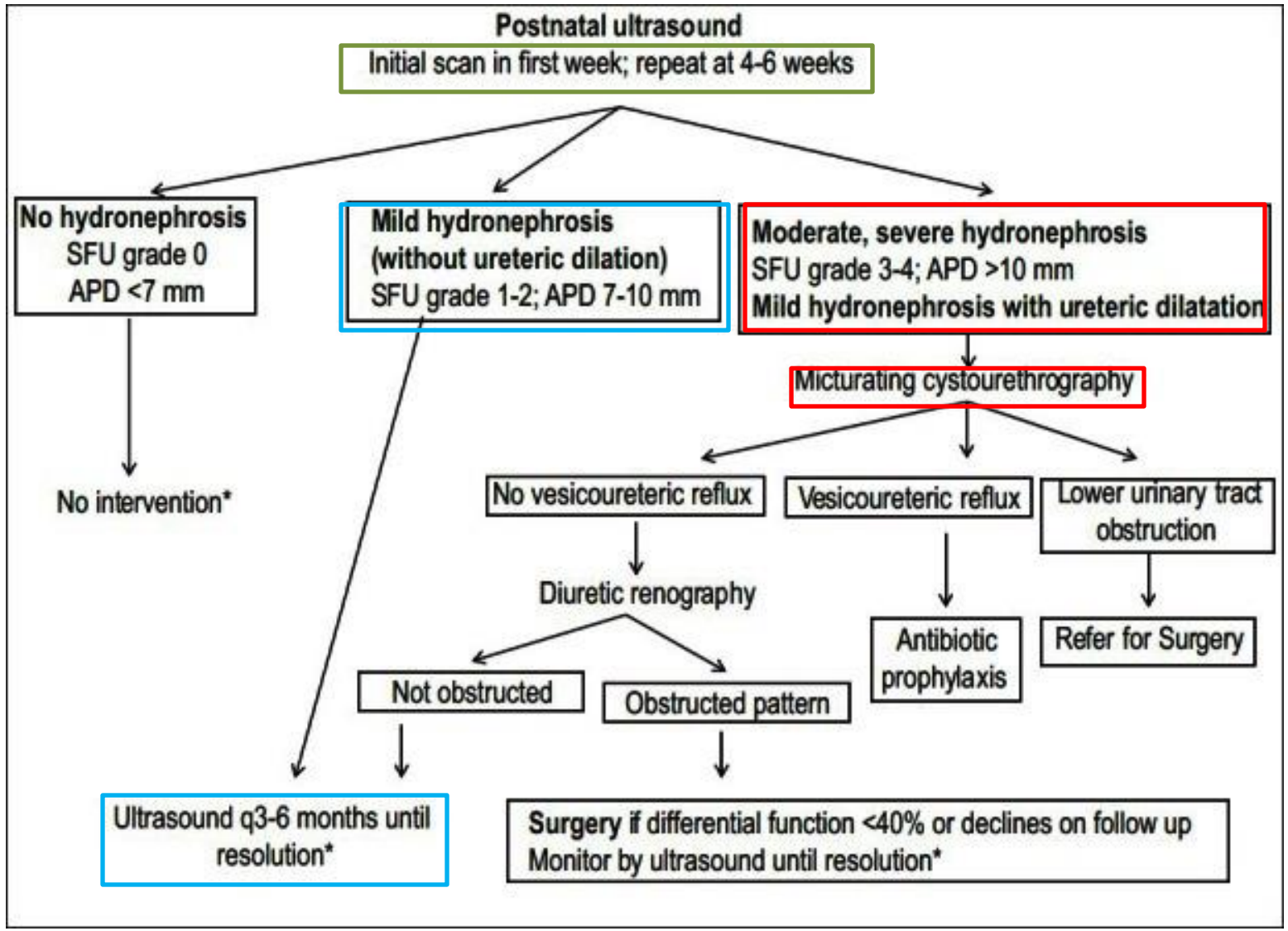
- all newborns with history of ANH
  -> within the first week of life (1B).

- suspected posterior urethral valves, oligohydramnios, severe bilateral hydronephrosis
  -> within 24-48 h of birth (1C).



*certain situations (e.g. posterior urethral valves, bilateral severe hydronephrosis) may require more expedient follow up

Guideline 4: Postnatal monitoring



Korean Journal of Pediatric Urology Vol. 2, No. 2: 59–63, 2010

REVIEW ARTICLE

신생아 수신증: 진료지침을 위한 제안

Neonatal Hydronephrosis: Proposal for Korean Guideline

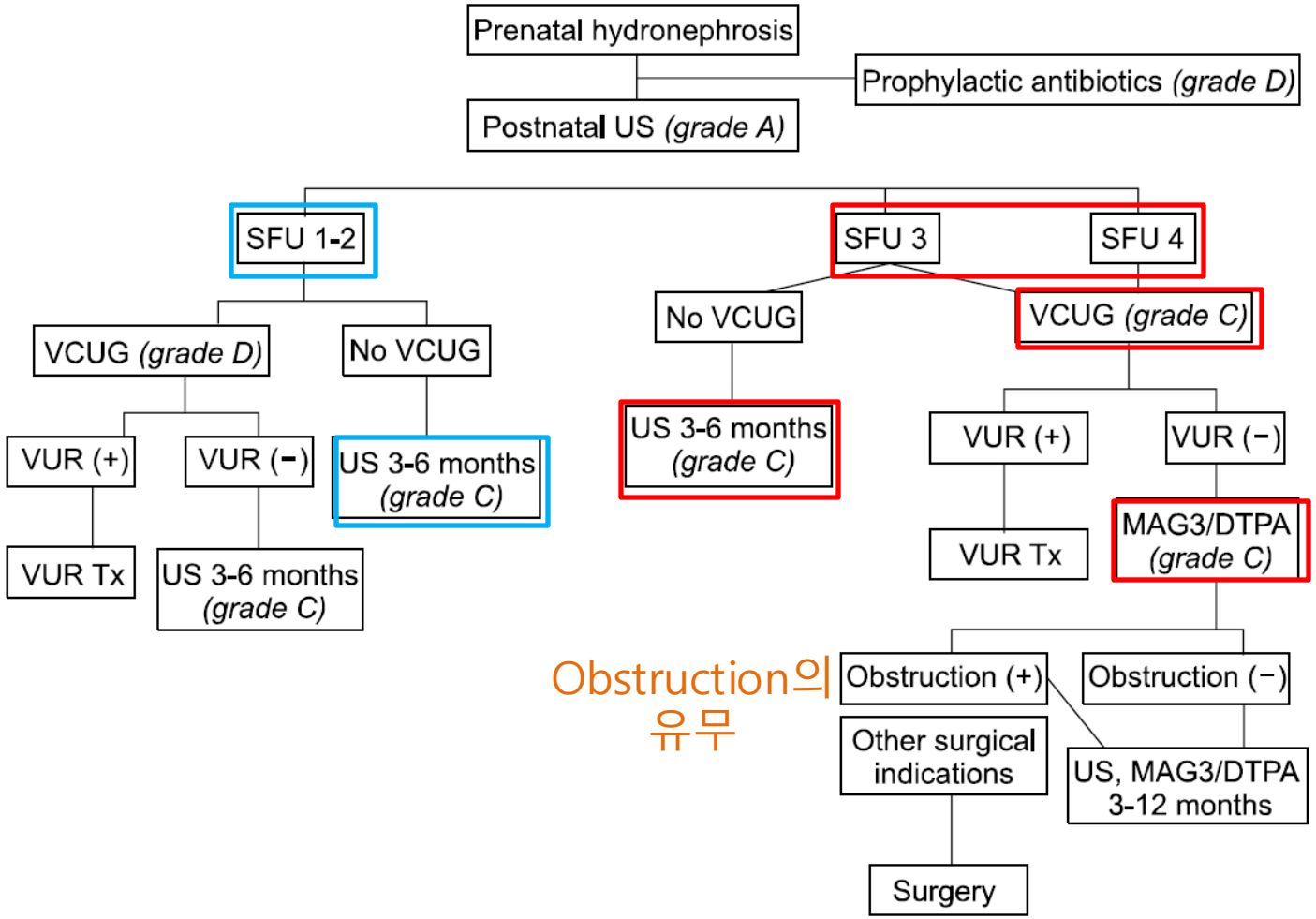
Sungchan Park, Mi

From the Department of Urology, University of
[1]Sungkyunkwan University School of

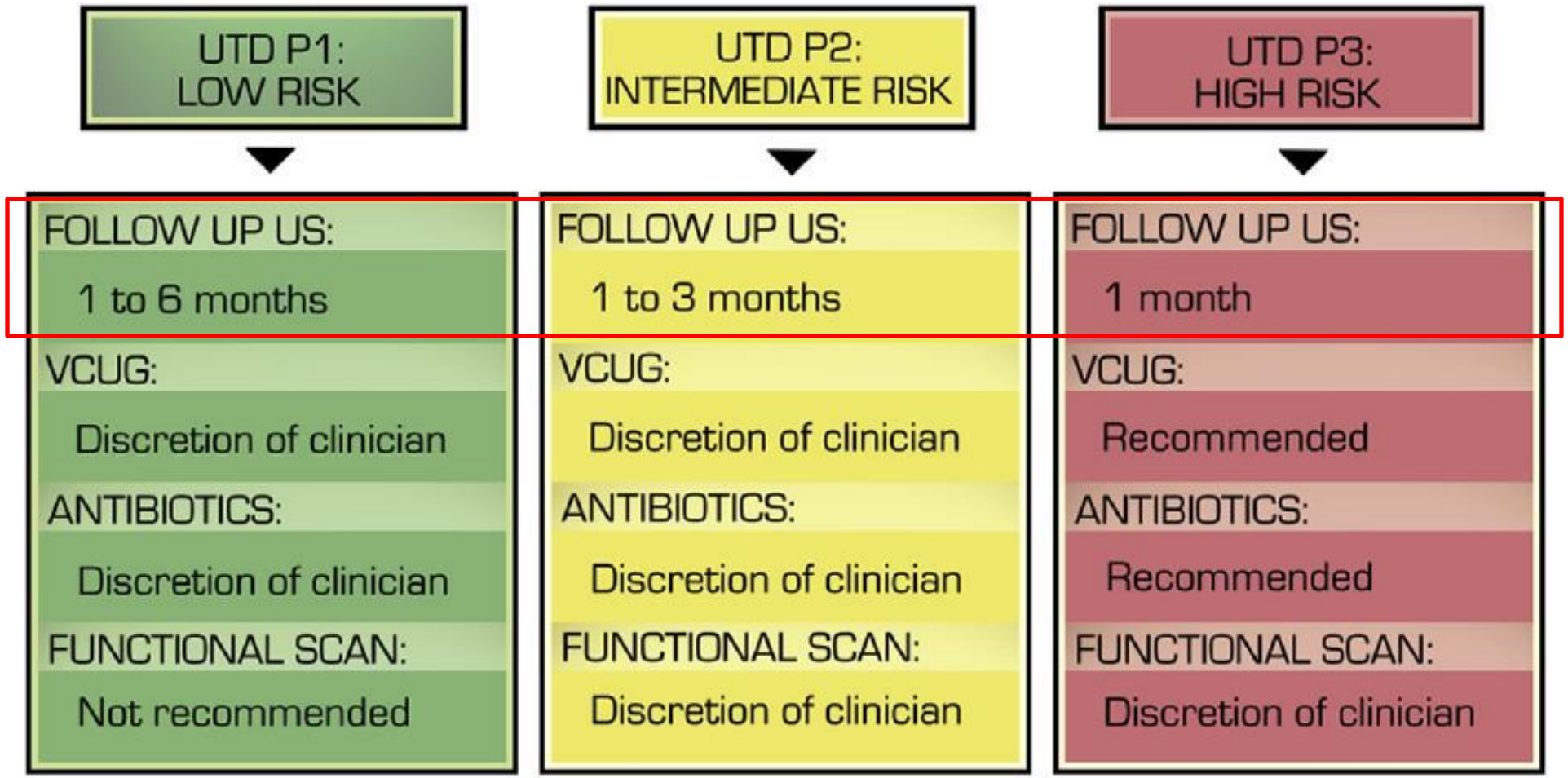
1. Who : 산전 수신증이 있었던 도
2. When : 생후 7-30일

VUR의 유무

Obstruction의 유무

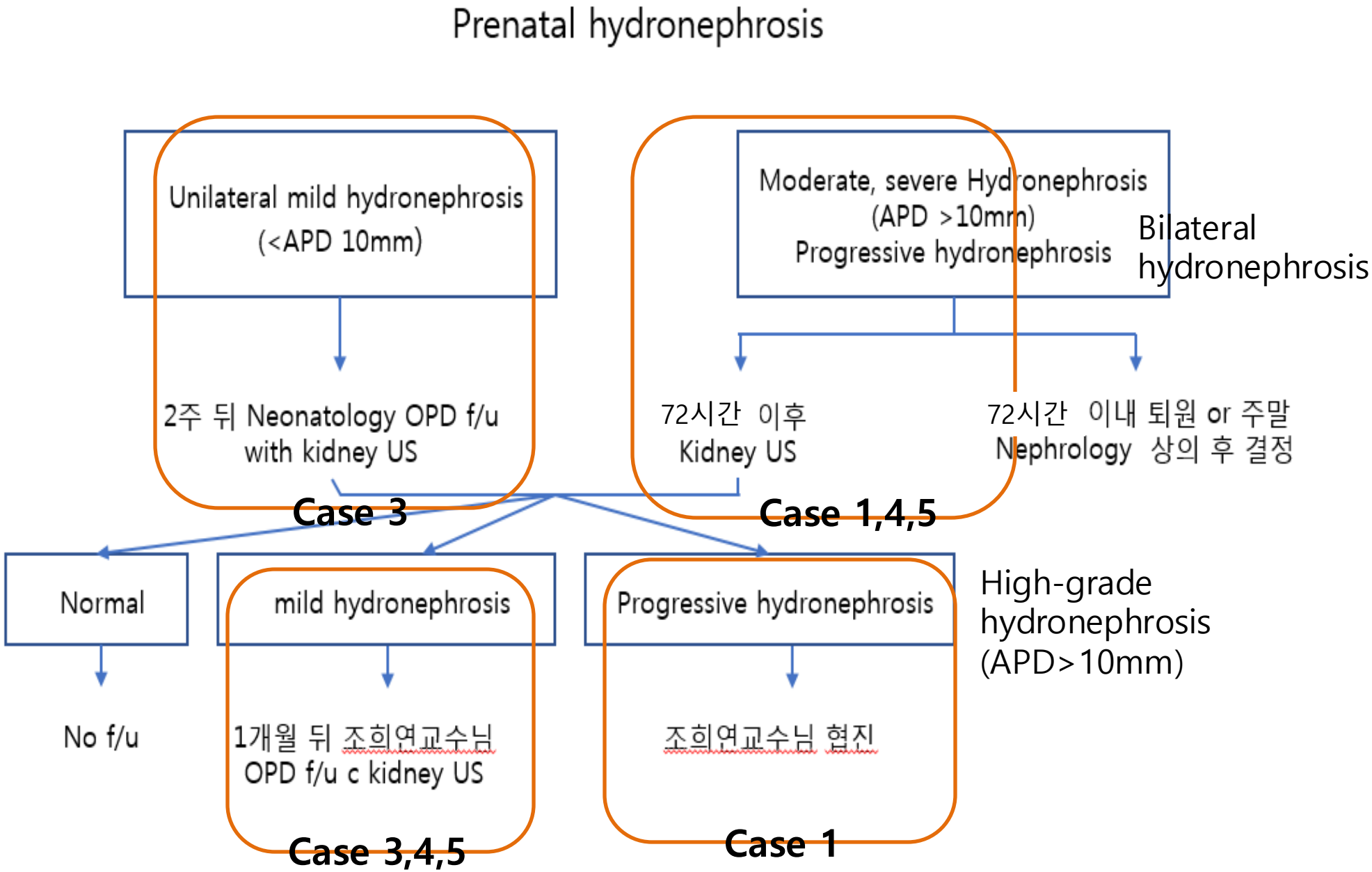


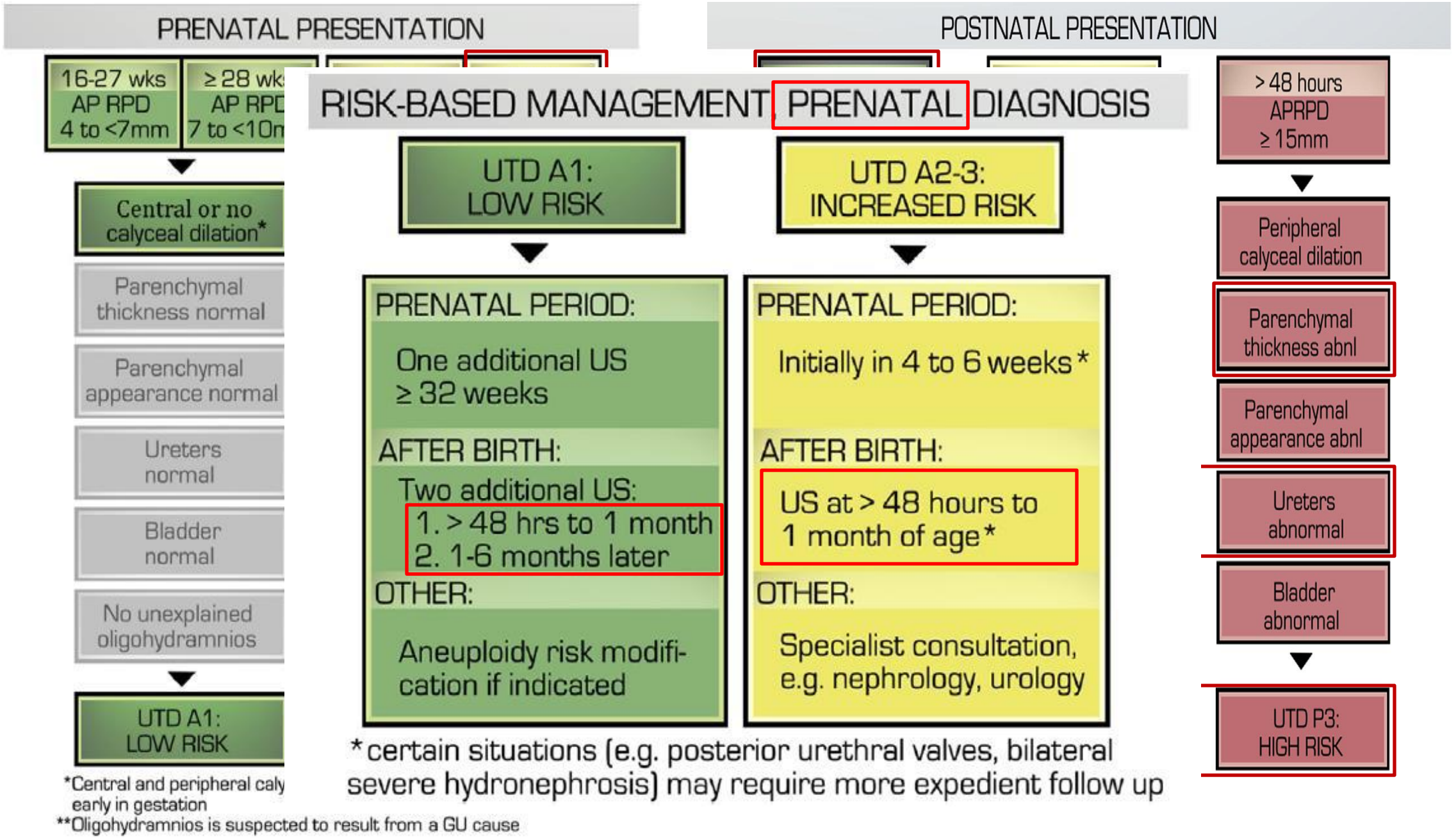
RISK-BASED MANAGEMENT, POSTNATAL DIAGNOSIS



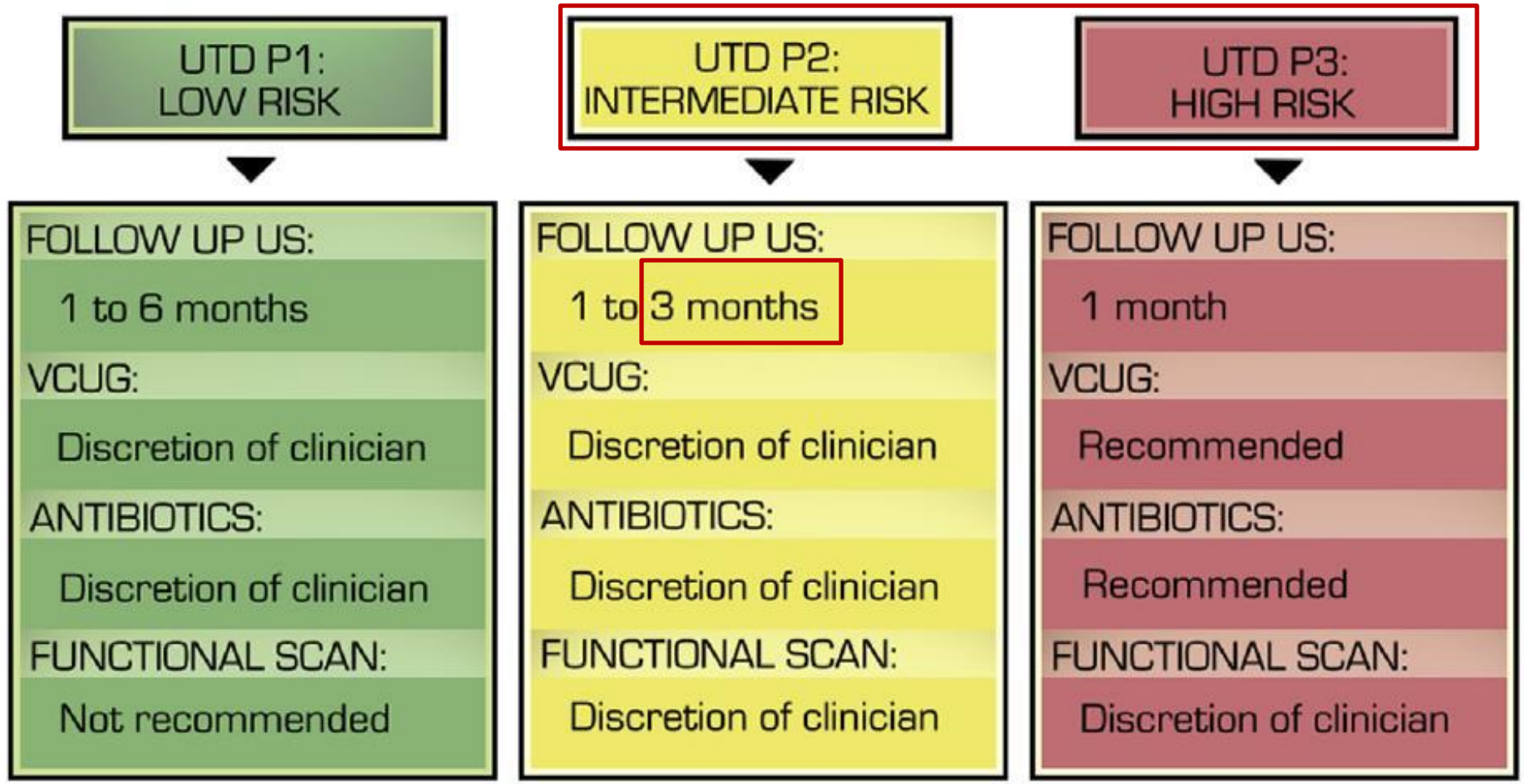
The choice to utilize prophylactic antibiotics or recommend voiding cystourethrogram will depend on the suspected underlying pathology

SMC NICU protocol

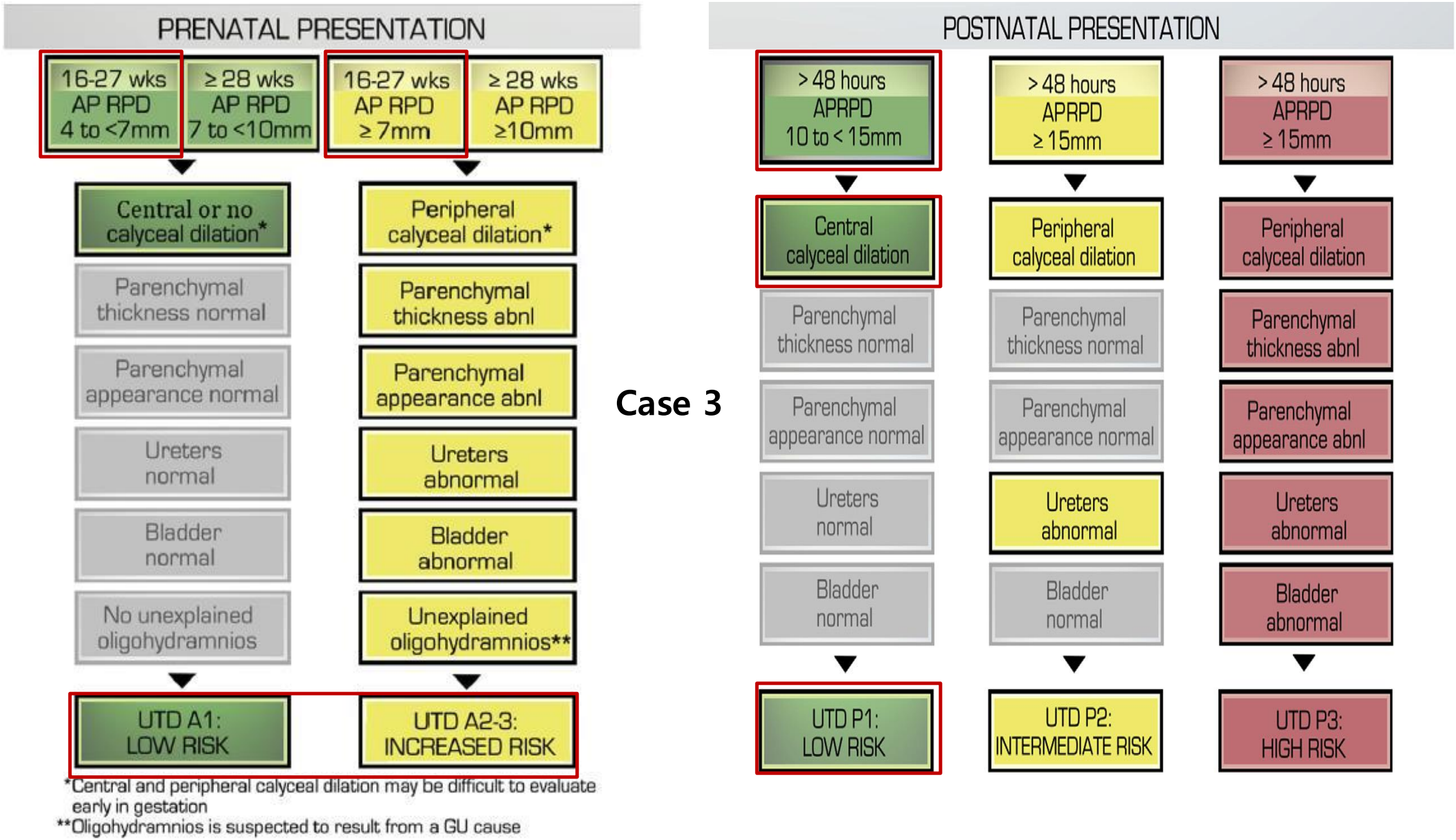



PRENATAL PRESENTATION
POSTNATAL PRESENTATION
RISK-BASED MANAGEMENT, PRENATAL DIAGNOSIS
16-27 wks
AP RPD
4 to <7mm
≥ 28 wk
AP RPD
7 to <10m
Central or no calyceal dilation*
Parenchymal thickness normal
Parenchymal appearance normal
Ureters normal
Bladder normal
No unexplained oligohydramnios
UTD A1:
LOW RISK
*Central and peripheral caly
early in gestation
**Oligohydramnios is suspected to result from a GU cause
UTD A1:
LOW RISK
PRENATAL PERIOD:
One additional US
≥ 32 weeks
AFTER BIRTH:
Two additional US:
1. > 48 hrs to 1 month
2. 1-6 months later
OTHER:
Aneuploidy risk modifi-
cation if indicated
UTD A2-3:
INCREASED RISK
PRENATAL PERIOD:
Initially in 4 to 6 weeks*
AFTER BIRTH:
US at > 48 hours to
1 month of age*
OTHER:
Specialist consultation,
e.g. nephrology, urology
*certain situations (e.g. posterior urethral valves, bilateral
severe hydronephrosis) may require more expedient follow up
> 48 hours
APRPD
≥ 15mm
Peripheral calyceal dilation
Parenchymal thickness abnl
Parenchymal appearance abnl
Ureters abnormal
Bladder abnormal
UTD P3:
HIGH RISK

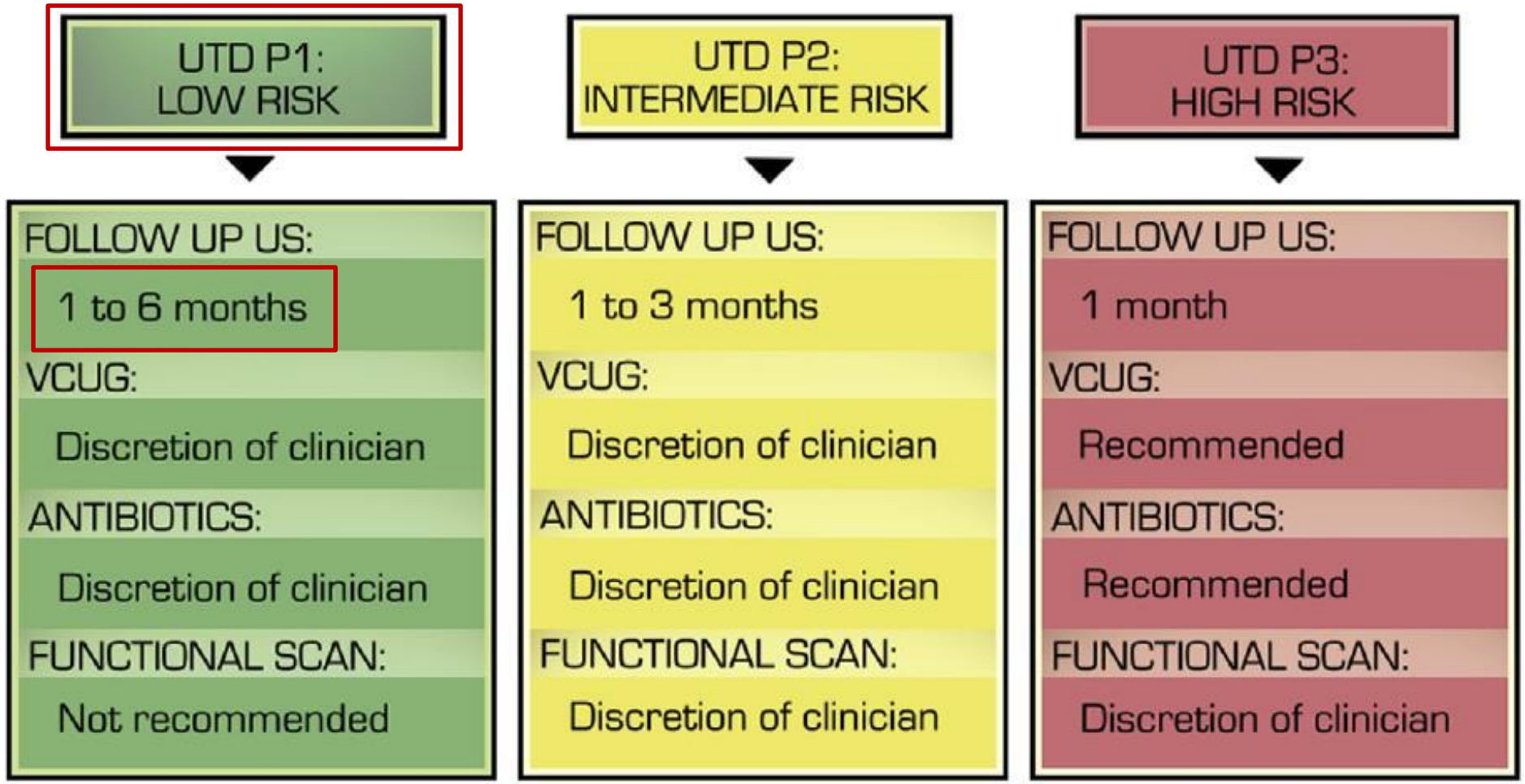
RISK-BASED MANAGEMENT, POSTNATAL DIAGNOSIS



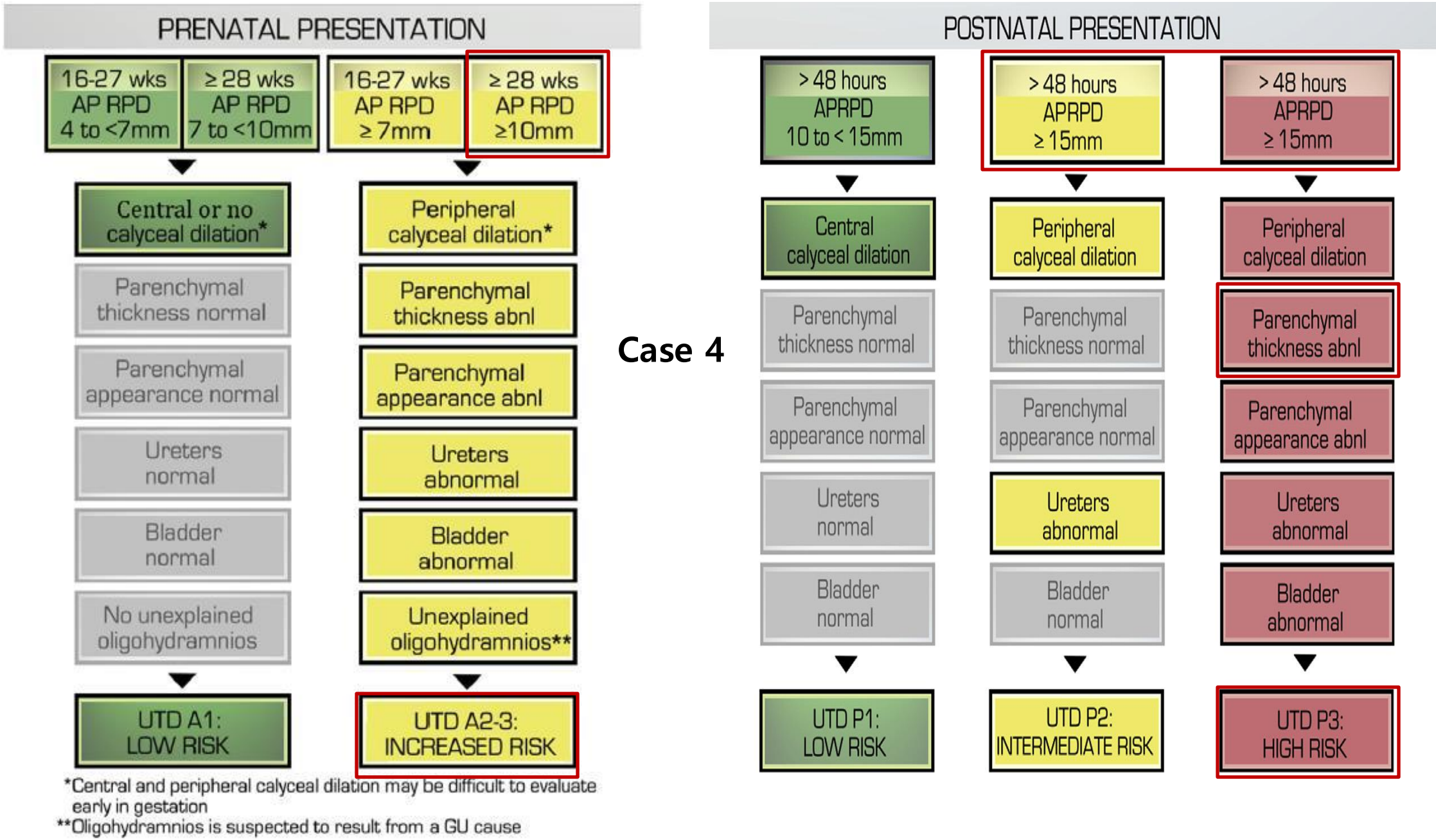
The choice to utilize prophylactic antibiotics or recommend voiding cystourethrogram will depend on the suspected underlying pathology


PRENATAL PRESENTATION
16-27 wks AP RPD 4 to <7mm
≥ 28 wks AP RPD 7 to <10mm
16-27 wks AP RPD ≥ 7mm
≥ 28 wks AP RPD ≥10mm
Central or no calyceal dilation*
Peripheral calyceal dilation*
Parenchymal thickness normal
Parenchymal thickness abnl
Parenchymal appearance normal
Parenchymal appearance abnl
Ureters normal
Ureters abnormal
Bladder normal
Bladder abnormal
No unexplained oligohydramnios
Unexplained oligohydramnios**
UTD A1: LOW RISK
UTD A2-3: INCREASED RISK
*Central and peripheral calyceal dilation may be difficult to evaluate early in gestation
**Oligohydramnios is suspected to result from a GU cause
Case 3
POSTNATAL PRESENTATION
> 48 hours APRPD 10 to < 15mm
> 48 hours APRPD ≥ 15mm
> 48 hours APRPD ≥ 15mm
Central calyceal dilation
Peripheral calyceal dilation
Peripheral calyceal dilation
Parenchymal thickness normal
Parenchymal thickness normal
Parenchymal thickness abnl
Parenchymal appearance normal
Parenchymal appearance normal
Parenchymal appearance abnl
Ureters normal
Ureters abnormal
Ureters abnormal
Bladder normal
Bladder normal
Bladder abnormal
UTD P1: LOW RISK
UTD P2: INTERMEDIATE RISK
UTD P3: HIGH RISK

RISK-BASED MANAGEMENT, POSTNATAL DIAGNOSIS



The choice to utilize prophylactic antibiotics or recommend voiding cystourethrogram will depend on the suspected underlying pathology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Central or no calyceal dilation*
Peripheral calyceal dilation*
Parenchymal thickness normal
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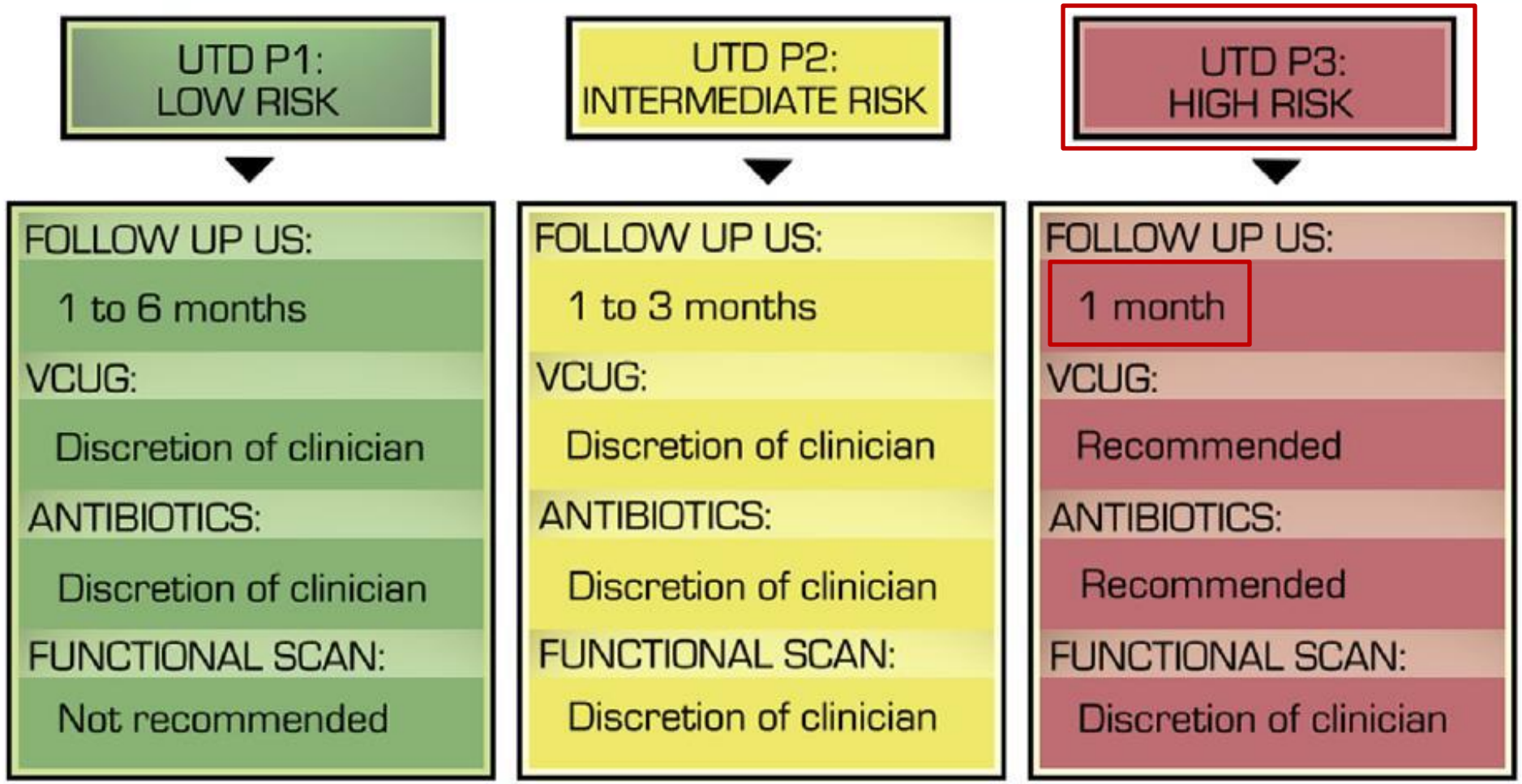
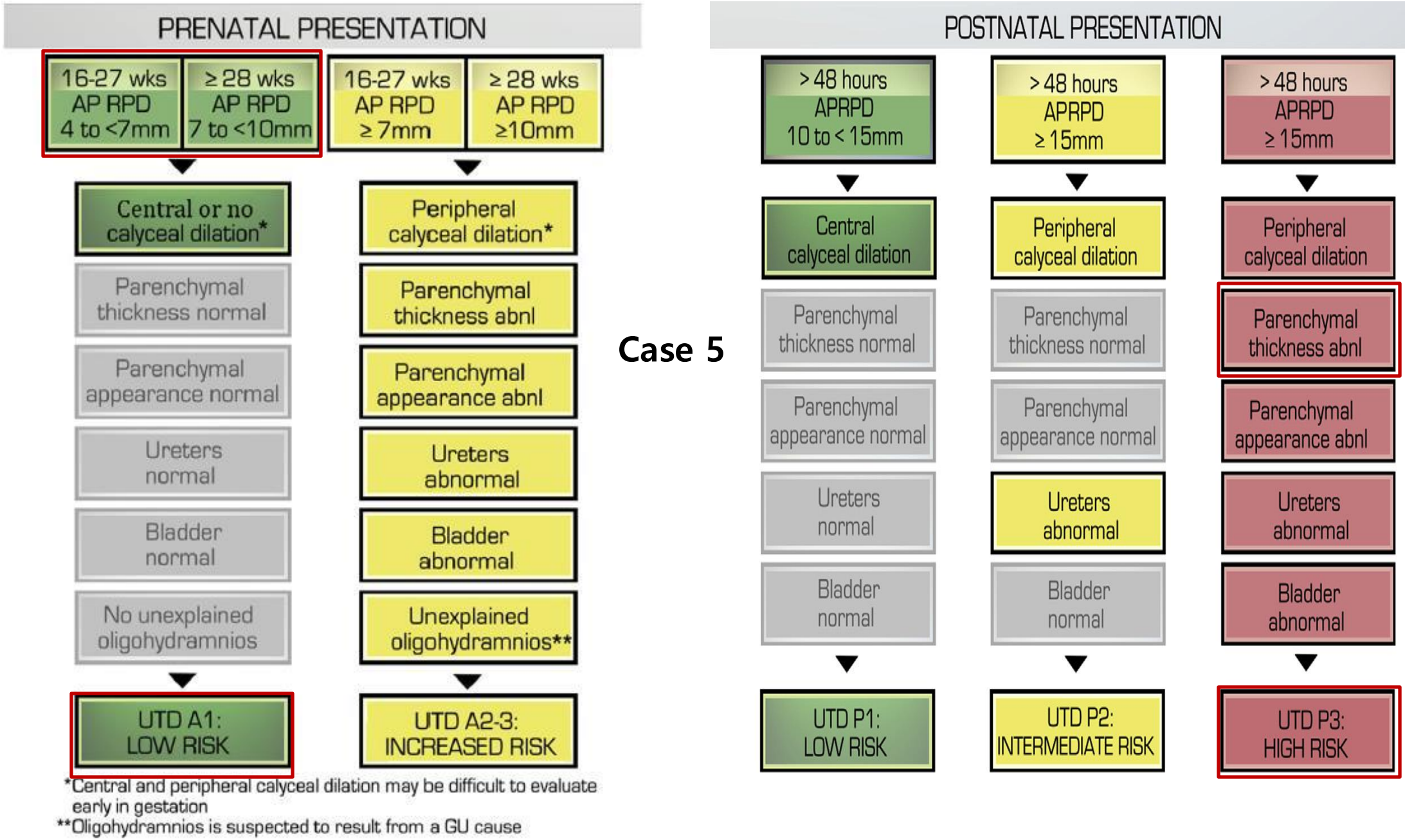
Parenchymal appearance normal
Parenchymal appearance abnl
Ureters normal
Ureters abnormal
Bladder normal
Bladder abnormal
No unexplained oligohydramnios
Unexplained oligohydramnios**
UTD A1: LOW RISK
UTD A2-3: INCREASED RISK
*Central and peripheral calyceal dilation may be difficult to evaluate early in gestation
**Oligohydramnios is suspected to result from a GU cause
Case 4
POSTNATAL PRESENTATION
> 48 hours APRPD 10 to < 15mm
> 48 hours APRPD ≥ 15mm
> 48 hours APRPD ≥ 15mm
Central calyceal dilation
Peripheral calyceal dilation
Peripheral calyceal dilation
Parenchymal thickness normal
Parenchymal thickness normal
Parenchymal thickness abnl
Parenchymal appearance normal
Parenchymal appearance normal
Parenchymal appearance abnl
Ureters normal
Ureters abnormal
Ureters abnormal
Bladder normal
Bladder normal
Bladder abnormal
UTD P1: LOW RISK
UTD P2: INTERMEDIATE RISK
UTD P3: HIGH RISK

RISK-BASED MANAGEMENT, POSTNATAL DIAGNOSIS



The choice to utilize prophylactic antibiotics or recommend voiding cystourethrogram will depend on the suspected underlying pathology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16-27 wks AP RPD 4 to <7mm
≥ 28 wks AP RPD 7 to <10mm
16-27 wks AP RPD ≥ 7mm
≥ 28 wks AP RPD ≥10mm
Central or no calyceal dilation*
Peripheral calyceal dilation*
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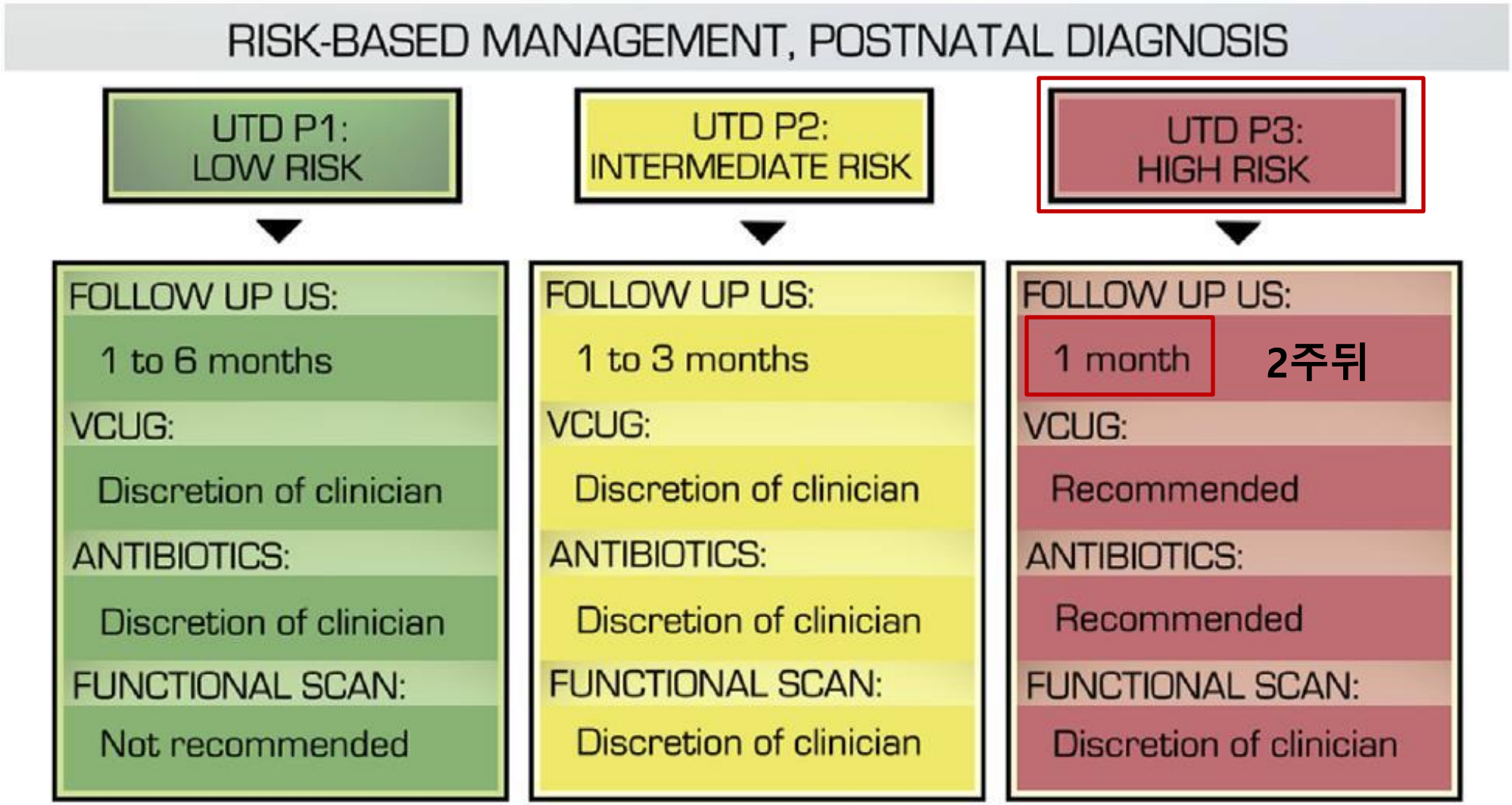
Parenchymal thickness abnl
Parenchymal appearance normal
Parenchymal appearance abnl
Ureters normal
Ureters abnormal
Bladder normal
Bladder abnormal
No unexplained oligohydramnios
Unexplained oligohydramnios**
UTD A1: LOW RISK
UTD A2-3: INCREASED RISK
*Central and peripheral calyceal dilation may be difficult to evaluate early in gestation
**Oligohydramnios is suspected to result from a GU cause
Case 5
POSTNATAL PRESENTATION
> 48 hours APRPD 10 to < 15mm
> 48 hours APRPD ≥ 15mm
> 48 hours APRPD ≥ 15mm
Central calyceal dilation
Peripheral calyceal dilation
Peripheral calyceal dilation
Parenchymal thickness normal
Parenchymal thickness normal
Parenchymal thickness abnl
Parenchymal appearance normal
Parenchymal appearance normal
Parenchymal appearance abnl
Ureters normal
Ureters abnormal
Ureters abnormal
Bladder normal
Bladder normal
Bladder abnormal
UTD P1: LOW RISK
UTD P2: INTERMEDIATE RISK
UTD P3: HIGH RISK



The choice to utilize prophylactic antibiotics or recommend voiding cystourethrogram will depend on the suspected underlying pathology

Conclusion

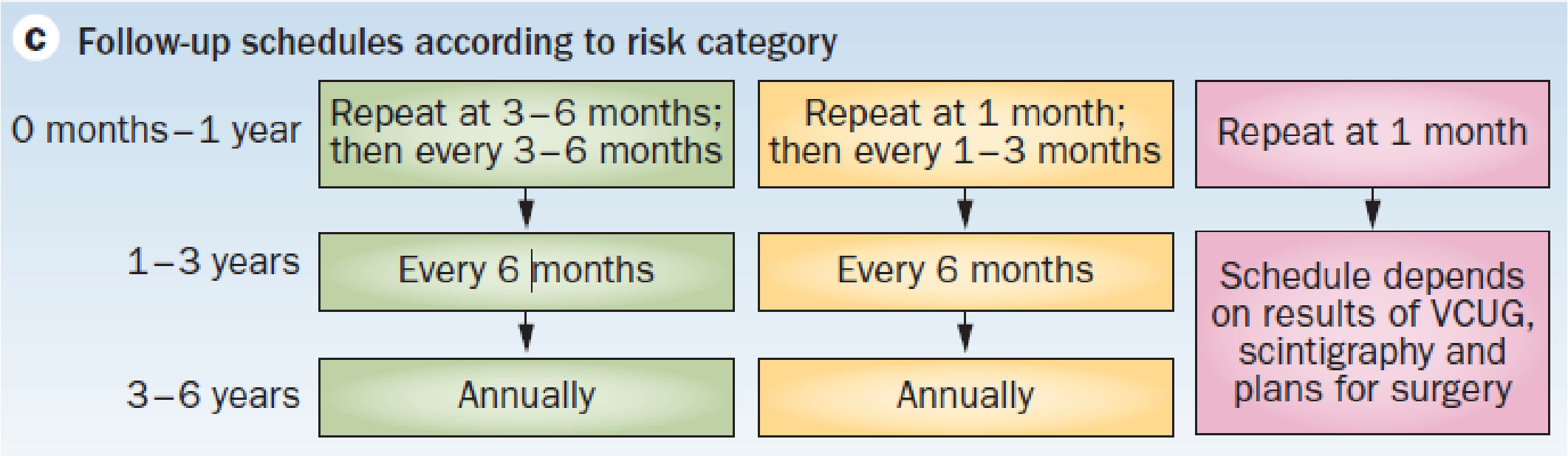
- Prenatal, Postnatal pelviectasia/hydronephrosis?
  → **UTD classification**

- Postnatal initial w/u의 시기?
  → **생후 72hr이후** 시행 (**생후 한달 이내** 시행)
  단, posterior urethral valve, severe bilateral UTD 등 예외
  시행하지 못하는 경우 **보호자 설명(산전 설명 필요)**

- US 시행 후 정식 reading?
  - 없을 경우 **verbal reading**에 따라 진행 -> UTD classification을 **US에 명시 필요**
  - 검사 소견 이상 없어 **consult 없이 퇴원시 Neo외래에서** 판독 확인
    -> reading **변경**이 있을 경우 빠른시일 내 **Nephro/URO 외래 f/u**

Consult???

감사합니다.


c Follow-up schedules according to risk category
0 months–1 year
1–3 years
3–6 years
Repeat at 3–6 months; then every 3–6 months
Every 6 months
Annually
Repeat at 1 month; then every 1–3 months
Every 6 months
Annually
Repeat at 1 month
Schedule depends on results of VCUG, scintigraphy and plans for surgery

Pediatr Nephrol (2006) 21:218–224
DOI 10.1007/s00467-005-2100-9

ORIGINAL ARTICLE

Gagan Sidhu · Joseph Beyene · Norman D. Rosenblum

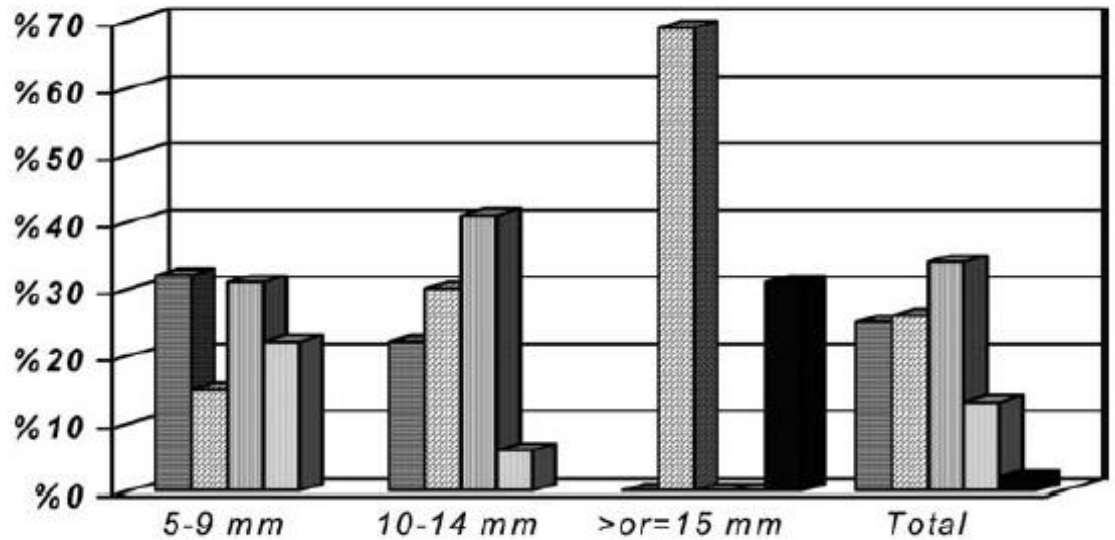
Outcome of isolated antenatal hydronephrosis: a systematic review and meta-analysis

- Overall resolution in milder IAHN(SFU 1-2, APD<12mm)

- 7 papers, stabilization of pelviectasis
  - Gr 1-2 98% (95% CI 0.93-1.0;p=0.0008) vs Gr 3-4 51% (95% CI 0.34-0.68; p<0.00001)
  - Gr 1-2 was 5 times more likely to stabilize than Gr 3-4 (OR 4.69; 95% CI 1.73-12.76; p=0.002)

- In patients with IAHN and lesser degrees of pelvic dilatation, pelvic diameter decreases to the normal range or does not worsen with the vast majority of patients.

Fig. 2 Dependence of outcome on extent of hydronephrosis



	5-9 mm	10-14 mm	>or=15 mm	Total
Normal	%32	%22	%0	%25
Surgery	%15	%30	%69	%26
Follow-up	%31	%41	%0	%34
Improved	%22	%6	%0	%13
Exitus			%31	%2

Pediatr Nephrol (2005)

Antenatal Hydronephrosis as a Predictor of Postnatal Outcome: A Meta-analysis

Richard S. Lee, MD[a], Marc Cendron, MD[a], Daniel D. Kinnamon, MS[b], Hiep T. Nguyen, MD[a]

[a]Department of Urology, Children's Hospital Boston, Boston, Massachusetts; [b]Department of Pediatrics, Division of Pediatric Clinical Research, University of Miami Miller School of Medicine, Miami, Florida

The authors have indicated they have no financial relationships relevant to this article to disclose.

ABSTRACT

OBJECTIVE. Antenatal hydronephrosis is diagnosed in 1% to 5% of all pregnancies; however, the antenatal and postnatal management of hydronephrosis varies widely. No previous studies define the risk of postnatal pathology in infants with antenatal hydronephrosis. Our objective was to review the current literature to determine whether the degree of antenatal hydronephrosis and related antenatal ultrasound findings are associated with postnatal outcome.

METHODS. We searched Medline (1966–2005), Embase (1991–2004), and the Cochrane Library databases for articles on antenatal hydronephrosis. We required studies to have subjects selected on the basis of documented measurements of antenatal hydronephrosis and followed to a postnatal diagnosis. We excluded case reports, review articles, and editorials. Two independent investigators extracted data.

RESULTS. We screened 1645 citations, of which 17 studies met inclusion criteria. We created a data set of 1308 subjects. The risk of any postnatal pathology per degree of antenatal hydronephrosis was 11.9% for mild, 45.1% for moderate, and 88.3% for severe. There was a significant increase in risk per increasing degree of hydronephrosis. The risk of vesicoureteral reflux was similar for all degrees of antenatal hydronephrosis.

CONCLUSIONS. The findings of this meta-analysis can potentially be used for prenatal counseling and may alter current postnatal management of children with antenatal hydronephrosis. Overall, children with any degree of antenatal hydronephrosis are at greater risk of postnatal pathology as compared with the normal population. Moderate and severe antenatal hydronephrosis have a significant risk of postnatal pathology, indicating that comprehensive postnatal diagnostic management should be performed. Mild antenatal hydronephrosis may carry a risk for postnatal pathology, but additional prospective studies are needed to determine the optimal management of these children. A well-defined prospective analysis is needed to further define the risk of pathology and the appropriate management protocols.

www.pediatrics.org/cgi/doi/10.1542/peds.2006-0120

doi:10.1542/peds.2006-0120

Key Words
hydronephrosis, renal, kidney disease, prenatal, outcome

Abbreviations
ANH—antenatal hydronephrosis
VCUG—voiding cystourethrogram
APD—anterior posterior diameter
UPJ—ureteropelvic junction obstruction
VUR—vesicoureteral reflux
CI—confidence interval

Accepted for publication Mar 8, 2006

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PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

TABLE 4 Subject Breakdown by Degree of ANH and Postnatal Pathology Among Included Studies

Source	Degree of Antenatal Hydronephrosis, *N*					Postnatal Pathology, *N* (%)
	Mild	Mild-Moderate	Moderate	Moderate-Severe	Severe	
Obido et al[40]	66	—	—	—	—	13 (20)
Kapadia et al[9]	17	—	58	—	26	45 (45)
Ismali et al[30]	—	213	—	—	—	83 (39)
Gloor et al[53]	19	—	—	—	—	5 (26)
Sairam et al[4]	191	—	—	36	—	19 (8)
Chowdhary et al[58]	—	—	—	—	38	38 (100)
Lepercq et al[25]	—	—	112	—	—	70 (63)
Fasolato et al[24]	37	—	8	—	5	8 (16)
Morin et al[59]	63	—	—	—	—	5 (8)
Langer et al[26]	25	—	51	—	13	13 (15)
Adra et al[8]	68	—	—	—	—	29 (43)
Tam et al[28]	52	—	—	27	—	34 (43)
Lam et al[23]	7	—	—	30	—	11 (30)
Wilhelm et al[22]	—	—	—	65	—	57 (88)
Rosendahl[34]	—	—	—	14	8	22 (100)
Kent et al[27]	27	—	6	—	4	13 (35)
Arger et al[29]	15	—	—	7	—	6 (27)
Total	587	213	235	179	94	471 (36)

TABLE 5 Risk of Pathology by Degree of ANH

Postnatal Pathology, % (95% CI)[a]	Degree of ANH					Trend *P*[b]
	Mild (*N* = 587)	Mild-Moderate (*N* = 213)	Moderate (*N* = 235)	Moderate-Severe (*N* = 179)	Severe (*N* = 94)	
Any Pathology	11.9 (4.5–28.0)	39.0 (32.6–45.7)	45.1 (25.3–66.6)	72.1 (47.6–88.0)	88.3 (53.7–98.0)	<.001
UPJ	4.9 (2.0–11.9)	13.6 (9.6–18.9)	17.0 (7.6–33.9)	36.9 (17.9–61.0)	54.3 (21.7–83.6)	<.001
VUR	4.4 (1.5–12.1)	10.8 (7.3–15.7)	14.0 (7.1–25.9)	12.3 (8.4–17.7)	8.5 (4.7–15.0)	.10
PUV	0.2 (0.0–1.4)	0.9 (0.2–3.7)	0.9 (0.2–2.9)	6.7 (2.5–16.6)	5.3 (1.2–21.0)	<.001
Ureteral obstruction	1.2 (0.2–8.0)	11.7 (8.1–16.8)	9.8 (6.3–14.9)	10.6 (7.4–15.0)	5.3 (1.4–18.2)	.025
Other[c]	1.2 (0.3–4.0)	1.9 (0.7–4.9)	3.4 (0.5–19.4)	5.6 (3.0–10.2)	14.9 (3.6–44.9)	.002

PUV indicates posterior urethral valve.

[a] Pointwise 95% CIs were estimated by logistic regression with robust SEs based on generalized estimating equations with a working independence correlation structure to adjust for clustering by study for all degrees of ANH except mild-moderate. Because only 1 study had subjects with mild-moderate ANH, the pointwise 95% CIs had to be estimated using logistic regression with unadjusted SEs.

[b] Testing for trend in risks with increasing degree of ANH using logistic regression with robust SEs based on generalized estimating equations with a working independence correlation structure.

[c] Includes prune belly syndrome, VATER syndrome, solitary kidney, renal mass, and unclassified.

Pediatr Nephrol (2012) 27:1119–1123
DOI 10.1007/s00467-012-2113-0

ORIGINAL ARTICLE

Natural history of bilateral mild isolated antenatal hydronephrosis conservatively managed

Laura Fernanda Alconcher · Maria Marcela Tombesi

- Inclusion : APD 5-15mm at 3rd trimester
  Exclusion : APD>15mm, calyectasis, hydroureteronephrosis, renal/bladder abnormalities

Table 1 Bilateral and unilateral mild isolated antenatal hydronephrosis outcome

NBs diagnosed with mild isolated antenatal hydronephrosis (n = 236)		Outcome				
Type and frequency of hydronephrosis	Number of hydronephrotic kidneys	Intra-utero resolution	Total resolution	Partial resolution	Stability	Progression
Bilateral (n = 98; 42%)	196	74 (38%)	82 (42%)	13 (7%)	24 (12%)	3 (1%)
Unilateral ((n = 138; 58%)	138	38 (27%)	58 (42%)	8 (6%)	33 (24%)	1 (0.5%)

p=0.07

Values are presented as the number, with the percentage, where appropriate, in parenthesis

NBs, Newborns

첫 1yrs, 80% total resolution
9% UTI, none reflux

-> Antibiotic prophylaxis and VCUG are not mandatory in bilateral mild IAHN.
-> But, clinical & US f/u are recommended

Table 1 Systems used to grade hydronephrosis and judge progression (*HN* hydronephrosis, *US* ultrasound, *IVP* intravenous pyelogram)

SFU grading system [8]	Features		
	Grade 0	No HN; intact central renal complex seen on US	
	Grade 1	Only renal pelvis visualized; dilated pelvis on US; no caliectasis on IVP	
	Grade 2	Moderately dilated renal pelvis and a few calices seen on IVP	
	Grade 3	HN with nearly all calyces seen; large renal pelvis and good parenchyma on US; large calyces seen on IVP	
	Grade 4	HN with nearly all calyces seen; with accompanying parenchymal atrophy or thinning	
Relative change in HN [1, 9, 10, 11, 12, 13, 14, 15, 16]	Increase/decrease relative to original/prenatal ultrasound		
Anterior-posterior pelvic diameter (*APPD*)			
Grignon (1986), grading system [22]	Grade	Size of pelvis	Calyceal dilatation
	Grade 1	1 cm	Physiological
	Grade 2	1–1.5 cm	Normal calyces
	Grade 3	>1.5 cm	Slight dilatation
	Grade 4	>1.5 cm	Moderate dilatation
	Grade 5	>1.5 cm	Severe dilatation and atrophic cortex
Blachar (1994), grading system [19]	Grade	Size of pelvis	Features
	Grade 0	<0.4 cm	Normal/ no hydronephrosis
	Grade 1	0.4–0.9 cm	Detectable hydronephrosis
	Grade 2	1–1.5 cm	Significant hydronephrosis, rounding of calyces
	Grade 3	>1.5 cm	Severe hydronephrosis and calyces; cortical atrophy and distorted renal anatomy
Individual investigator defined APPD ranges used to grade hydronephrosis [14, 18, 20,21]	<12 mm		
	>12 mm		
	10–14 mm		
	15–20 mm		
	20–40 mm		
	>40 mm		
	Severe	>19 mm	
	Moderate	13–19 mm	
	Mild	6–12 mm	

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Diagnosis of obstructive hydronephrosis in infants: comparison sonograms performed 6 days and 6 weeks after birth.

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ABSTRACT :

The purpose of this study was to compare the usefulness of renal sonograms obtained 6 days and 6 weeks after birth in differentiating obstruction from nonobstruction in patients with antenatal pyelocaliceal dilatation shown by sonography and to establish sonographic criteria to determine the degree of postnatal pyelocaliceal dilatation that warrants further investigation.

Criteria for an infant to enter the study were fetal pyelectasis of 4 mm or greater, two postnatal sonograms with the second showing persisting pyelectasis extending at least into the infundibula, and a voiding cystourethrogram showing normal findings. One hundred thirty kidneys in 100 infants met the study criteria. The first postnatal sonogram was obtained at a mean age of 6 days (range, 1-14 days) and the second at a mean age of 6.6 weeks (range, 3-16 weeks). The degree of pyelectasis was measured in the anteroposterior direction on the transverse postnatal sonograms. The diagnosis of obstruction was made by excretory urography in 99 infants and nephrostography in one infant. Kidneys were categorized as definitely obstructed, possibly obstructed (anatomic features of obstruction on excretory urogram but functionally not obstructed), or not obstructed. Receiver-operating-characteristic (ROC) curves based on renal pelvic diameters were plotted for both sonograms; the ability to detect definite obstruction or possible obstruction was compared for the two time periods; and optimal cutoff points were determined.

The mean diameter of the renal pelvis was not significantly different between the sonogram obtained at 6 days and the sonogram obtained at 6 weeks for the 86 nonobstructed kidneys. For the 27 kidneys that were obstructed, the mean pelvic diameter increased from 18 mm (range, 5-54 mm) on the sonogram obtained at 6 days to 22 mm (range, 11-60 mm) on the sonogram obtained at 6 weeks. The mean pelvic diameter of 17 kidneys categorized as possibly obstructed increased from 6 mm (range, 0-11 mm) to 10 mm (range, 6-20 mm) between the first and second sonograms. The ROC curves for all sonograms obtained at 6 weeks provided cutoff points with greater sensitivity and specificity than did the curves for the sonograms obtained at 6 days. The optimal cutoff points were 6 mm for possible obstruction (sensitivity, 100%; specificity, 57%) and 11 mm for definite obstruction (sensitivity, 100%; specificity, 57%) and 11 mm for definite obstruction (sensitivity, 100%; specificity, 96%).

Renal obstruction may be underestimated or missed on a renal sonogram obtained 6 days after birth. A sonogram obtained 6 weeks after birth is more specific for detecting obstruction.