Significant Proteinuria at 23 weeks: Evaluation and Management

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Significant Proteinuria at 23 weeks

Pre ecclampsia

Routine Antenatal Care for the Healthy Pregnant Women: FOGSI: 2015:

Test for proteinuria at

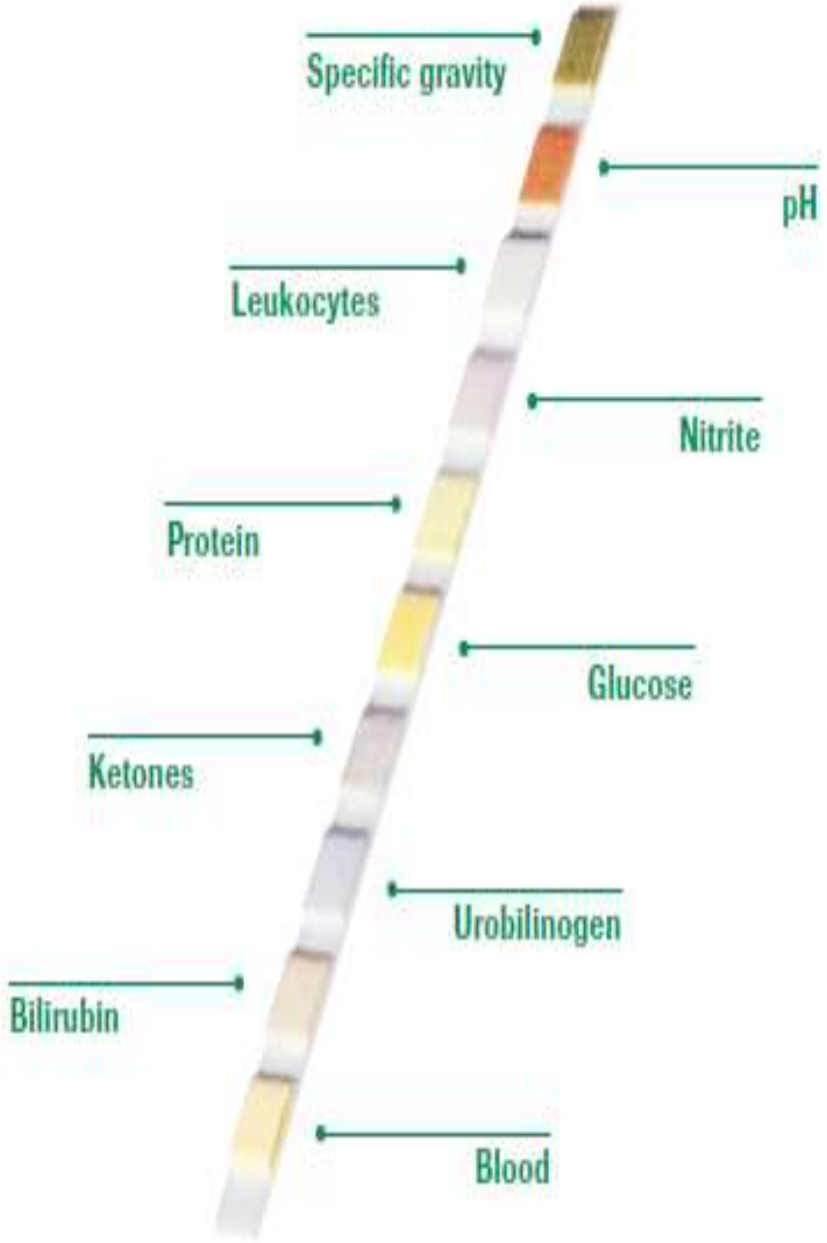
16-20 weeks

26 weeks

Urinalysis

- "Dipstick" method: chemical reactions cause color changes on ten different pads on the test strip.

1. Leukocytes
2. Nitrite
3. Urobilinogen
4. Protein
5. pH
6. Blood
6. Blood
7. Ketones
8. Bilirubin
9. Glucose



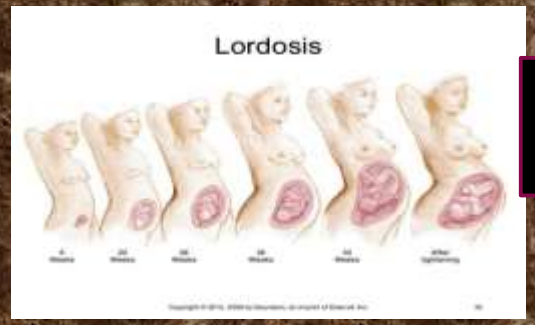
negative	0 mg/dL
trace	15-30 mg/dL
1+	30-100 mg/dL
2+	100-300 mg/dL
3+	300-1000 mg/dL
4+	>1000 mg/dL

False positive

- Gross haematuria
- Dipstick is immersed too long
- Very alkaline urine
- Detergents, disinfectants, drugs.
- High specific gravity.
- Infection
- Exercise

False Negative

- High salt concentration
  Low specific gravity
- High maternal hydration



Lordotic position for a long time

Diurnal variations

Variations in proteinuria, more marked in preecclampsia due to vasospasm

Urine dipstick reagents are more reactive to albumin in urine.

Proteins, such as globulins, hemoglobin, Bence-Jones protein, and mucoprotein, may remain undetected.

What is Significant Proteinuria in Pregnancy

- Total protein in 24 hours urine > 300mg
- Protein : Creatinine ratio in random sample > 0.1

24 hour urine protein excretion

- Cumbersome and may require admission
- Costly and time consuming
- Collection errors, storage difficulties, specimen handling, and poor patient compliance.
- Pointless when urgent delivery is required due to worsening maternal and foetal condition.

Rest in supine position → Stagnation in calyces → Not actual 24 hour value

Creatinine, a product of muscle metabolism is produced at a nearly constant rate

Thus creatinine level in urine directly measures GFR.(glomerular filtration rate)

When kidney function is reduced, urine creatinine initially falls.

With further kidney damage,serum creatinine rises.

Vigorous exercise or muscular trauma occurring during the collection will cause an increased amount of creatinine in the blood and may lead to false creatinine clearance results.

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The diurnal variation of specific gravity of urine due to changing GFR results in varying concentrations of urinary protein at different times of the day.

$$\frac{\text{Spot urinary protein(Varying)}}{\text{Urinary creatinine level, which is GFR dependent}}$$

→ Constant ratio through out the day.

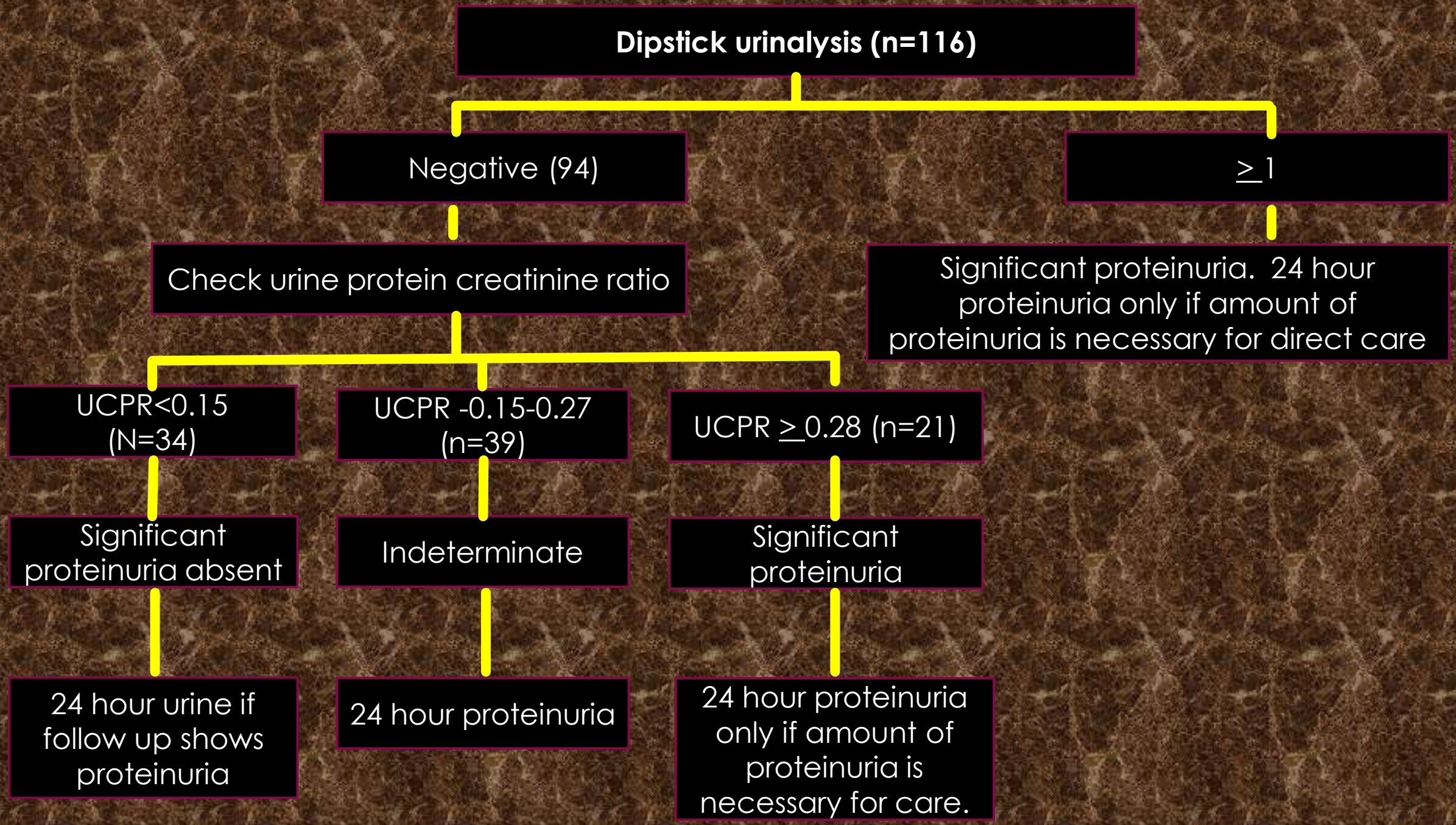
Reliable indicator of Proteinuria.

Spot urine protein : creatinine ratio (UPCR) correlates well with 24 hours

Can be ordered on outpatient basis

Results are available in a short time

supposed to help the obstetrician in quick decision making and management planning.


Dipstick urinalysis (n=116)
Negative (94)
≥ 1
Check urine protein creatinine ratio
Significant proteinuria. 24 hour proteinuria only if amount of proteinuria is necessary for direct care
UCPR<0.15 (N=34)
UCPR -0.15-0.27 (n=39)
UCPR ≥ 0.28 (n=21)
Significant proteinuria absent
Indeterminate
Significant proteinuria
24 hour urine if follow up shows proteinuria
24 hour proteinuria
24 hour proteinuria only if amount of proteinuria is necessary for care.

Is significant proteinuria, either on urine dipstick measurement or 24-hour urine collection, always a sign of an organic process or condition?

Proteinuria may be detected at the end of the day , even when it is absent in the morning.

This is due to pressure of the lumbar spine on the left renal vein while standing.

Rule out postural proteinuria

urine is collected with the patient in lateral recumbence for the given period of time, usually 8 hours, and then the quantity of protein excreted during this timed collection is extrapolated to 24 hours

Significant proteinuria at 23 weeks

Do urine routine and rule out infection. Do culture if necessary.

Serum creatinine to be measured .

Rule out congestive heart failure and severe anaemia which can cause hypoxia of the kidney

Request other "preeclampsia tests" (eg, platelet number, serum albumin, urate, and certain liver function tests

Proteinuria occasionally precedes other manifestations of preeclampsia

Some blood pressure readings exceeding 120/70 mm Hg but still below 140/90 mm Hg may occur in so-called normotensive preeclamptic and eclamptic patients

Increased renal blood flow

Functional proteinuria
(exercise, fever, high-output heart failure),

orthostatic proteinuria,

Primary glomerular disorders

Focal segmental
glomerulosclerosis,
membranous nephropathy,
minimal change disease,
IgA nephropathy

Secondary glomerular disorders

Diabetic nephropathy,
preeclampsia,
postinfectious
glomerulonephritis,
HIV,
hepatitis B and C,
syphilis, lupus nephritis,
amyloidosis, sarcoidosis,
sickle cell disease,
Alport's syndrome.

Fanconi syndrome, heavy metal ingestion, acute tubular necrosis,
tubulointerstitial nephritis, lymphoma, monoclonal gammopathy, multiple myeloma,
myelodysplastic syndromes, hypertensive nephrosclerosis, ischemic renal disease/renal artery,
and interstitial nephritis.

Significant proteinuria

Proteinuria documented before 20th week

Known kidney disease

New onset proteinuria with hypertension

Preexisting renal disease.

Probably worsening of renal disease.

Mostly preecclampsia

Rarely de novo renal disease like lupus nephritis.

????Renal disease?

No information on the presence or absence of proteinuria in early pregnancy

????Preecclampsia??

In women at risk for underlying renal disease (for example, women with chronic hypertension, diabetes mellitus and systemic lupus erythematosus, always quantify protein excretion in early pregnancy

Clinical and laboratory features	Active lupus nephritis	Preeclampsia
Hypertension	Onset before 20 weeks	Onset after 20 weeks
Proteinuria	≥300 mg/day	≥300 mg/dl
Urinary sediment	Active	Inactive
Uric acid	≤5.5 mg/dl	>5.5 mg/dl
DNA antibody levels	Rising	Stable or negative
24 h urine calcium	≥195 mg/day	<195 mg/day
Complement levels	≥25% drop	Normal

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Renal disease patients can be delivered at term

Preeclampsia may have to be delivered early

Proteinuria due to preeclampsia resolves within 12 weeks of delivery.

If Proteinuria does not resolve within 12 weeks of delivery should be followed-up closely to enable detection and treatment of underlying kidney disease or chronic hypertension .

Preeclampsia.

Blood pressure and urine is checked at every antenatal appointment.

Investigations in preeclampsia also include

- Blood tests,
- Ultrasounds, Umbilical artery Doppler scans and
- Cardiotocography.

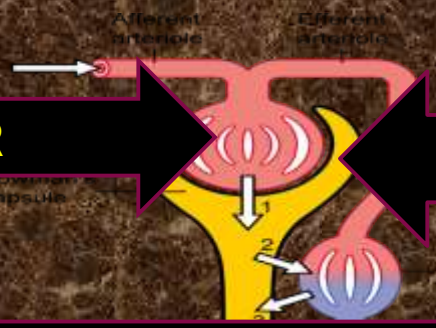
Proteinuria in Preecclampsia

Indicates poorer prognosis

Severe preeclampsia

Poorer foetal outcome

Increased GFR



Increased permeability

Proteinuria in pregnancy

Glomerular endotheliosis in preeclampsia

Lower GFR

Lower renal plasma flow

Nephrotic syndrome

- Reduction of oedema to a level that shows comfort during ambulation

- Dietary intake of sodium may be limited to 1.5 grams of sodium per day (about 60 mEq) to reduce new oedema formation provided normal blood pressure is maintained

Urinary excretion of abnormal quantities of protein for 3 months or longer = Chronic renal disease.

Presence of proteinuria is an independent factor for end-stage renal disease and death within the general population, and also in patients with chronic kidney disease.

Recent advances

- A novel serum test for early diagnosis of preeclampsia has been developed, which relies on detection of abnormal levels of placentally-derived angiogenic factors, sFlt1 (soluble fms-like tyrosine kinase-1) and PlGF (placental growth factor) .

- This diagnostic test is available in Europe (Roche Diagnostics, Rotkreuz, Switzerland) and is being evaluated by the FDA for use in the United States.

- Although more studies are needed to validate its use, this serum test may prove useful and cost-effective in distinguishing preeclampsia from other causes of proteinuria in pregnancy

4 hour urine protein estimations was shown to corelate with 24 hour protein estimations

Summary

Fresh midstream urine specimen obtained as a clean voided specimen before pelvic examination minimizes the chance of contamination from vaginal secretions.

Dipstick does give false-+ve and false- -ve, results. It is most predictive of Abn. 24-hour proteinuria if +2 or greater.

Positive urine dipsticks should be followed-up with a quantitative test.
The urinary protein-to-creatinine (PC) ratio (mg protein/mg creatinine) is an accurate, convenient, and relatively rapid method to quantify proteinuria in pregnancy. A urine PC ratio less than 0.15 mg/mg may be considered normal Ratios between 0.15 and 0.7 mg/mg should be further evaluated by 24-hour urine collection.
If a 24 hr urine collection is not obtained, a pr:cr ratio of 0.26 mg (30 mg/mmol) in a random urine sample is sugg.as the threshold for significant proteinuria.

- The GA at diagnosis is important in establishing the likelihood of preeclampsia versus other renal disease.
- In early pregnancy (before 20 weeks of gestation) suggests preexisting renal disease.
- In late pregnancy, the presence of hypertension or other signs/symptoms of severe preeclampsia (eg, thrombocytopenia, elevated liver transaminases), if present, also helps to distinguish preeclampsia from underlying renal disease.

- Preeclampsia is the most common cause of proteinuria in pregnancy and must be excluded in all women with proteinuria first identified after 20 weeks of gestation. If preeclampsia is excluded, then the presence of primary or secondary renal disease should be considered.

- If renal biopsy is indicated for diagnosis, it is usually better to wait until the patient is postpartum unless unexplained rapidly progressive loss of renal function is occurring.


THANK
YOU!