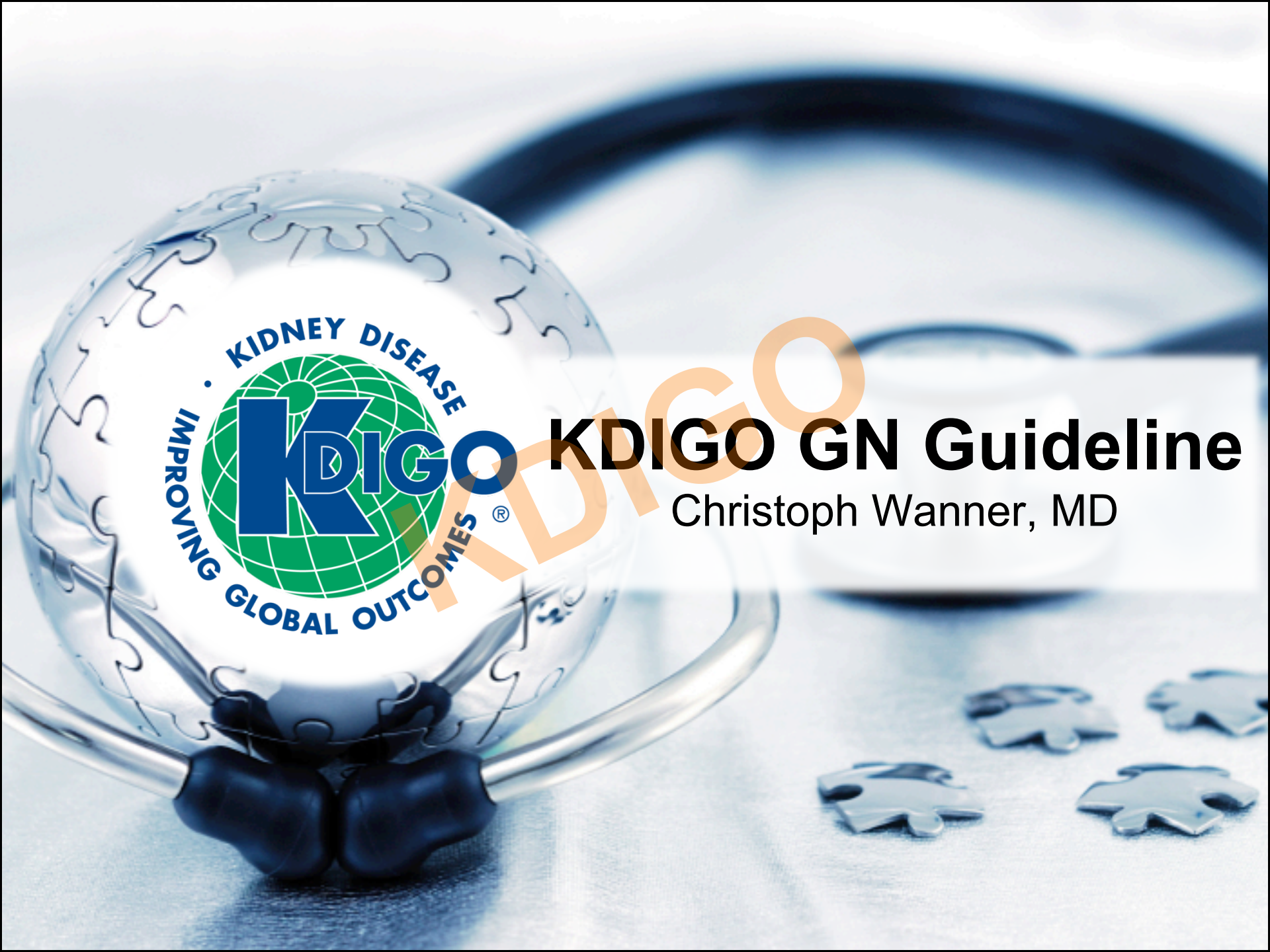


KDIGO GN Guideline

Christoph Wanner, MD

Guidelines on Glomerulonephritis:

Background, overview and general management principles (chapters 1 and 2)

- Minimal change disease
- Focal segmental glomerulosclerosis
- Nephrotic syndrome in children

The faces tour (Jean Dubuffet 1988)

Less is more

Because……

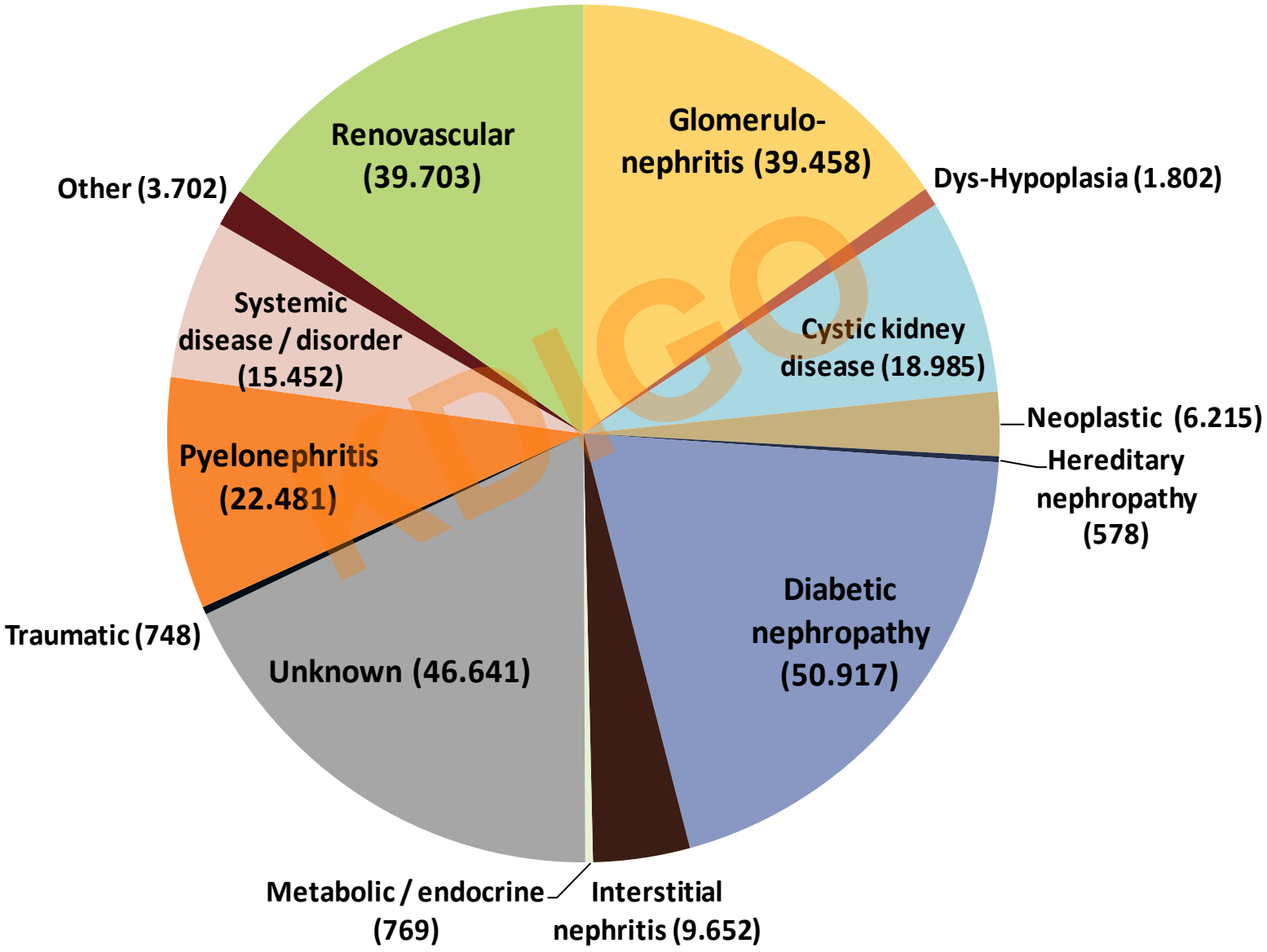
GN is not one disease, but a number of rare diseases (one size does not fit all).

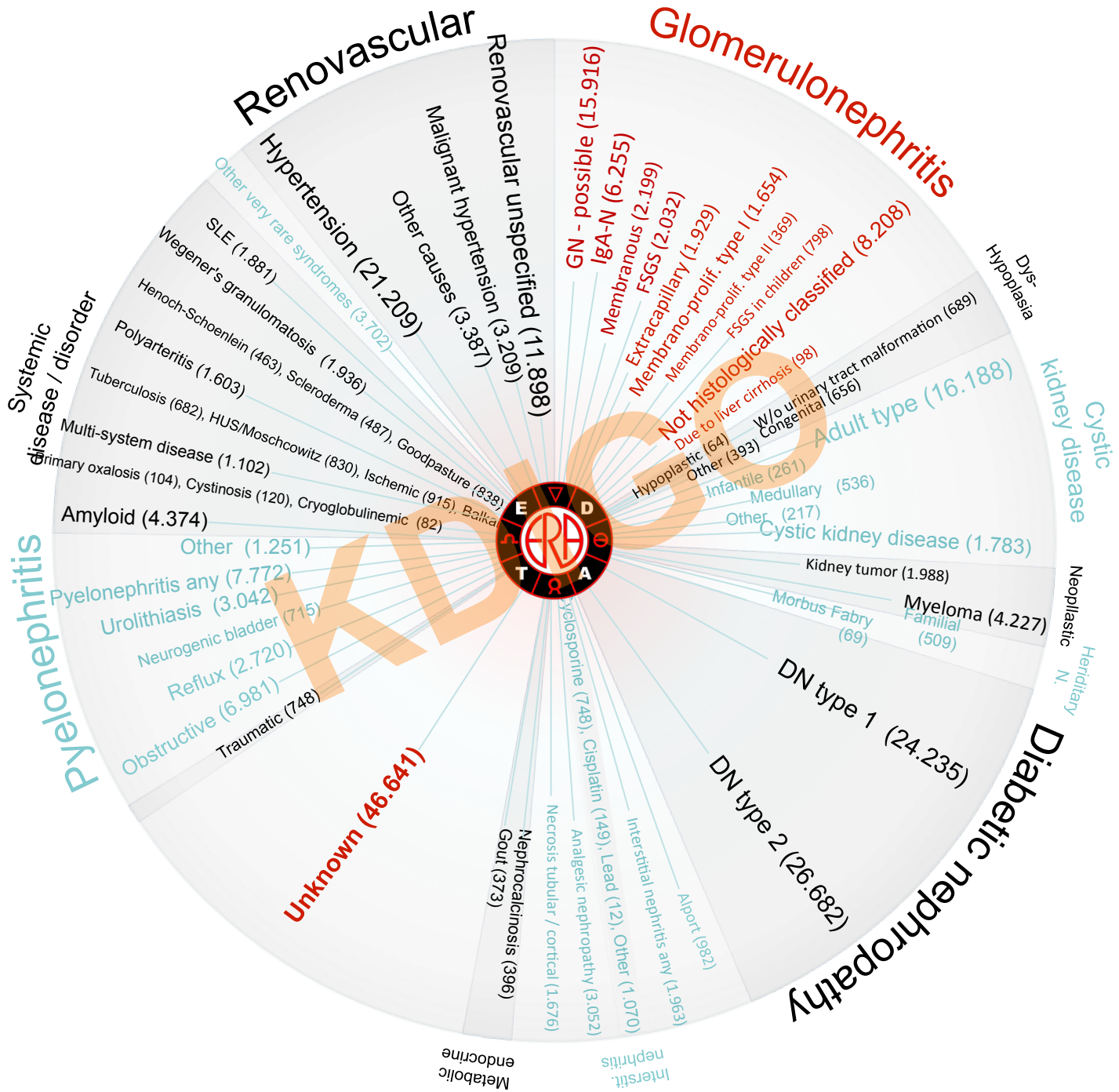
In the absence of deap understanding we offer agressive treatments.

But …….

Children: Induce remission of the NS (>80% of cases)
Prevent the relapses (70% of cases)
Avoid the side effects of the treatment

The ERA-EDTA Registry Database 2010




Renovascular
Renovascular unspecified (11.898)
Malignant hypertension (3.209)
Other causes (3.387)
Hypertension (21.209)
Other very rare syndromes (3.702)
Glomerulonephritis
GN - possible (15.916)
IgA-N (6.255)
Membranous (2.199)
FSGS (2.032)
Extracapillary (1.929)
Membrano-prolif. type I (1.654)
Membrano-prolif. type II (369)
FSGS in children (798)
Not histologically classified (8.208)
Due to liver cirrhosis (98)
Hypoplastic (64)
Other (393)
Dys-Hypoplasia
W/o urinary tract malformation (689)
Congenital (656)
Cystic kidney disease
Adult type (16.188)
Infantile (261)
Medullary (536)
Other (217)
Cystic kidney disease (1.783)
Kidney tumor (1.988)
Myeloma (4.227)
Neoplastic
Morbus Fabry (69)
Familial (509)
Heriditary N.
Diabetic nephropathy
DN type 1 (24.235)
DN type 2 (26.682)
Alport (982)
Interstitial nephritis any (1.963)
Analgesic nephropathy (3.052)
Necrosis tubular / cortical (1.676)
Cyclosporine (748), Cisplatin (149), Lead (12), Other (1.070)
Interstit. nephritis
Unknown (46.641)
Nephrocalcinosis (396)
Gout (373)
Metabolic endocrine
Pyelonephritis
Amyloid (4.374)
Other (1.251)
Pyelonephritis any (7.772)
Urolithiasis (3.042)
Neurogenic bladder (715)
Reflux (2.720)
Obstructive (6.981)
Traumatic (748)
Systemic disease / disorder
SLE (1.881)
Wegener's granulomatosis (1.936)
Henoch-Schoenlein (463), Scleroderma (487), Goodpasture (338)
Polyarteritis (1.603)
Tuberculosis (682), HUS/Moschcowitz (830), Ischemic (915), Balka
Multi-system disease (1.102)
Primary oxalosis (104), Cystinosis (120), Cryoglobulinemic (82)
KDIGO

The starting point….

….. is the morphological characterization of the glomerular lesion. The diagnosis has to be established by an adequate kidney biopsy reviewed by a knowledgeable nephropathologist.

….. in the case of some children with nephrotic syndrome are characteristic clinical features.

Kidney Biopsy and Repeat Kidney Biopsy

Renal biopsy is a technically easy procedure and has a low complication rate

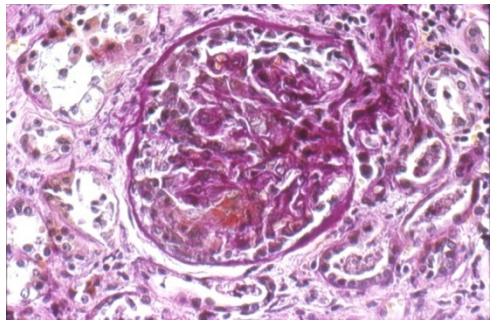
In many parts of the world kidney biopsies are done by nephrologists (often bedside)

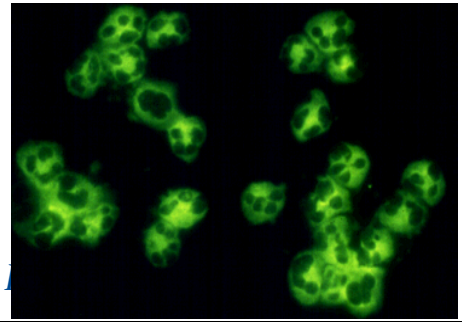
In Germany, 5 known renal pathologist cover most of the country - 80 Mio people (~12.000 biopsies/year)

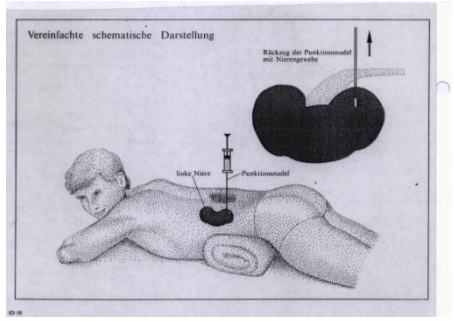
I pay (my hospital) 35 € for courier service and 300 € for the pathologist.

I get LM the same day. IM the next day and EM after one week.

It has happened that RPGN diagnosis is made by LM (friday) and serum tests (i.e. vasculitis) came later (monday).







Progression ….

10.1.2. Assess the risk of progression in all cases by evaluation of proteinura, blood pressure and eGFR at the time of diagnosis and during follow-up *(not graded)*

10.1.3. Pathological features may be used to assess prognosis *(not graded)*

Not graded was used, typically, to provide guidance based on common sense or where the topic does not allow adequate application of evidence.

Prognosis of CKD by GFR and Albuminuria Categories: KDIGO 2012

GFR categories (ml/min/ 1.73 m^2) Description and range				Persistent albuminuria categories Description and range		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				<30 mg/g <3 mg/mmol	30-300 mg/g 3-30 mg/mmol	>300 mg/g >30 mg/mmol
	G1	Normal or high	≥90			
	G2	Mildly decreased	60-89			
	G3a	Mildly to moderately decreased	45-59			
	G3b	Moderately to severely decreased	30-44			
	G4	Severely decreased	15-29			
	G5	Kidney failure	<15			

Intervention ….

We recommend / suggest supportive therapy (i.e. low salt & ACEi or ARB treatment)

Don't harm (avoid): NSAIDs
smoking
tonsillectomy
severe prolonged hypokalemia
phosphate containing laxatives

5.4: Supportive therapy

5.4.1: We suggest that MCD patients who have AKI be treated with renal replacement therapy as indicated, but together with corticosteroids, as for a first episode of MCD. (2D)

5.4.2: We suggest that, for the initial episode of nephrotic syndrome associated with MCD, statins not be used to treat hyperlipidemia, and ACE-I or ARBs not be used in normotensive patients to lower proteinuria. (2D)

Can I ask you a question about GN, rare diseases and management:

Pick the "wrong statement" or guess the most unlikely one

A) In the *ERA-EDTA Dialysis Registry* (250.000 cases) less than 1% of cases are FSGS

B) And less than 3% of cases are IgA-N

C) Renal biopsy (including EM) is mandatory (i.e. adults)

D) Always try to assess progression

E) Oral cyclophosphamide is a valuable treatment for many GNs with NS

Definitions of nephrotic syndrome

JSN	KDIGO
Urine protein ≥ 3.5 g/d	Urine protein > 3.5 g/d*
and	*and*
serum alb. ≤ 3.0 g/dl	serum alb. ≤ 2.5 g/dl
and	*and*
edema	edema

*Or uPCR > 2000 mg protein / g creatinine

Definition of nephrotic syndrome

Proteinuria >3.5 g per 24 hours
(in children, >40 mg/m^2/hr *or*
PCR >2000 mg/g [>200 mg/mmol] *or*
>300 mg/dl or 3+ on urine dipstick)

plus

hypoalbuminemia

and

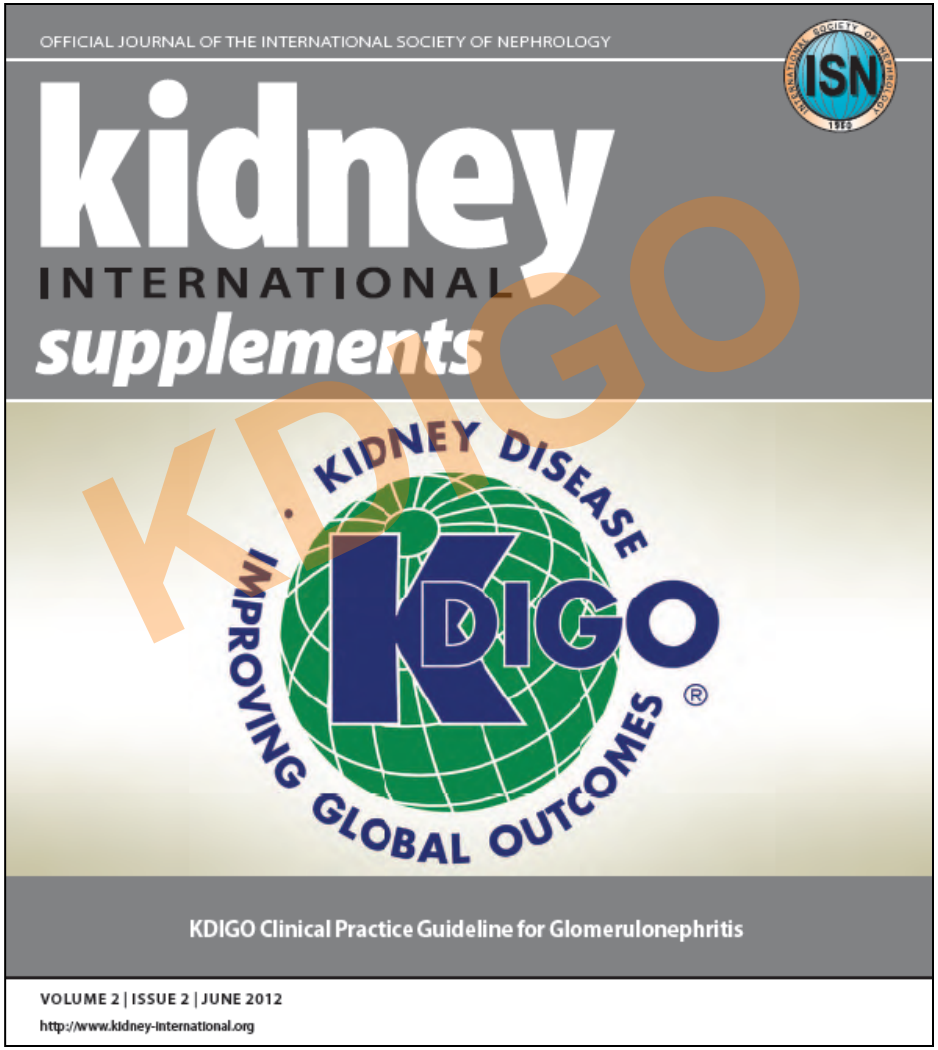
edema

Guidelines on glomerulonephritis:

Background, overview and general management principles

- Minimal change disease (MCD)
- Focal segmental glomerulosclerosis (FSGS)
- Nephrotic syndrome in children

Minimal-change disease in adults



5.1: Treatment of initial episode of adult MCD (1)

5.1.1: We recommend that corticosteroids be given for initial treatment of nephrotic syndrome. (1C)

5.1.2: We suggest prednisone or prednisolone* be given at a daily single dose of 1 mg/kg (maximum 80 mg) or alternate-day single dose of 2 mg/kg (maximum 120 mg). (2C)

5.1.3: We suggest the initial high dose of corticosteroids, if tolerated, be maintained for a minimum period of 4 weeks if complete remission is achieved, and for a maximum period of 16 weeks if complete remission is not achieved. (2C)

5.1: Treatment of initial episode of adult MCD (2)

5.1.4: In patients who remit, we suggest that corticosteroids be tapered slowly over a total period of up to 6 months after achieving remission. (2D)

5.1.5: For patients with relative contraindications or intolerance to high-dose corticosteroids (e.g., uncontrolled diabetes, psychiatric conditions, severe osteoporosis), we suggest oral cyclophosphamide or CNIs as discussed in frequently relapsing MCD. (2D)

5.1.6: We suggest using the same initial dose and duration of corticosteroids for infrequent relapses as in recommendations 5.1.2, 5.1.3, and 5.1.4. (2D)

guidance

Grading of the evidence

2	Different choices will be appropriate for different patients. Each patients needs help to arrive at a management decision consistent for her of his preferences.
C	The true effect may be substantial different from the estimated of the effect.
D	The estimate of the effect is very uncertain, and often will be far from the truth.

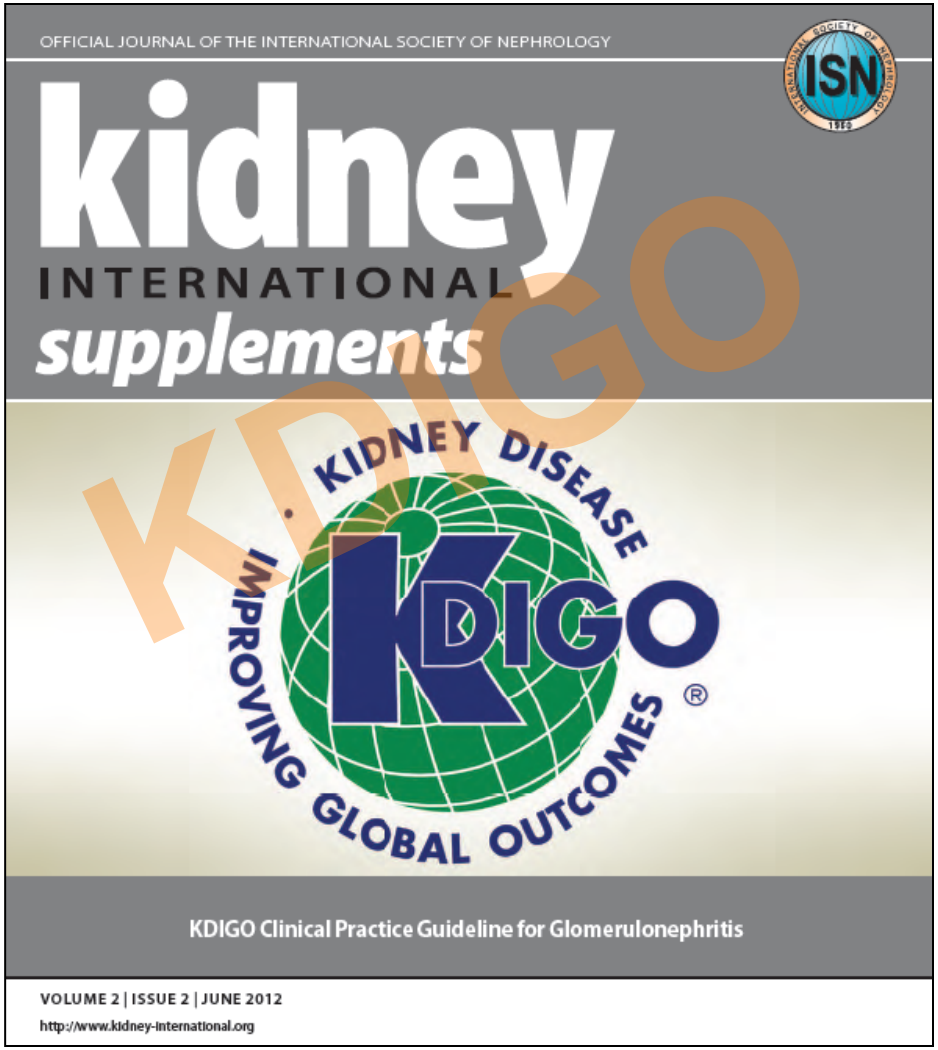
5.2: FR/SD MCD

5.2.1: We suggest oral cyclophosphamide 2-2.5 mg/kg/d for 8 weeks. (2C)

5.2.2: We suggest CNI (cyclosporine 3-5mg/kg/d or tacrolimus 0.05-0.1mg/kg/d in divided doses) for 1-2 years for FR/SD MCD patients who have relapsed despite cyclophosphamide, or for people who wish to preserve their fertility. (2C)

5.2.3: We suggest MMF 500-1000 mg twice daily for 1-2 years for patients who are intolerant of corticosteroids, cyclophosphamide, and CNIs. (2D)

Idiopathic FSGS in adults



6.1: Initial Evaluation of FSGS

6.1.1: Undertake thorough evaluation to exclude secondary forms of FSGS. (Not Graded)

6.1.2: Do not routinely perform genetic testing. (Not Graded)

Rule Out Secondary FSGS

1. Familial
    a. Mutations in a-actinin 4
    b. Mutations in NPHS1 (nephrin)
    c. Mutations in NPHS2 (podocin)
    d. Mutations in WT-1
    e. Mutations in TRPC6
    f. Mutations in SCARB2 (LIMP2)
    g. Mutations in INF2 (formin)
    h. Mutations in CD2-associated

Rule Out Secondary FSGS

2. Virus associated
    a. HIV-associated nephropathy
    b. Parvovirus B19

3. Medication
    a. Heroin-nephropathy
    b. Interferon-a
    c. Lithium
    d. Pamidronate/alendronate

Rule Out Secondary FSGS

4. Adaptive structural-functional responses likely mediated by glomerular hypertrophy or hyperfiltration

4.1 Reduced kidney mass

a. Oligomeganephronia
b. Unilateral kidney agenesis
c. Kidney dysplasia
d. Cortical necrosis
e. Reflux nephropathy
f. Surgical kidney ablation
g. Chronic allograft nephropathy
h. Any advanced kidney disease with reduction in functioning nephrons

Rule Out Secondary FSGS

4. Adaptive structural-functional responses likely mediated by glomerular hypertrophy or hyperfiltration

4.2 Initially normal kidney mass

a. Diabetes mellitus
b. Hypertension
c. Obesity
d. Cyanotic congenital heart disease
e. Sickle cell anemia

Rule Out Secondary FSGS

5. Malignancy (lymphoma)

6. Nonspecific pattern of FSGS caused by kidney scarring in glomerular disease
    a. Focal proliferative glomerulonephritis (IgAN, LN, pauci-immune focal necrotizing and crescentic GN)
    b. Hereditary nephritis (Alport syndrome)
    c. Membranous glomerulopathy
    d. Thrombotic microangiopathy

5.3.1: Re-evalulate patients who are corticosteroid resistant for other causes of nephrotic syndrome. (Not Graded)

KDIGO Definitions in Adult FSGS

Classification	Definition
Complete remission	<0.3 g/d (<300 mg/g) and normal serum creatinine and serum albumin >3.5 g/dL (35 g/L)
Partial remission	0.3–3.5 g/d (300–3500 mg/g) and change in serum creatinine <25% *or* 0.3–3.5 g/d (300–3500 mg/g) and decrease >50% and change in serum creatinine <25%
Relapse	>3.5 g/d or >3500 mg/g after complete remission
Frequent relapse	Not defined in adults
Steroid dependent	Two relapses during therapy or within 2 weeks of completing steroid therapy
Steroid resistant	Persistence of proteinuria despite prednisone 1 mg/kg/d or 2 mg/kg every other day for >4 mo

6.2: Initial treatment of FSGS

6.2.1: We recommend that corticosteroid and immunosuppressive therapy be considered only in idiopathic FSGS associated with clinical features of the nephrotic syndrome. (1C)

6.2.2: We suggest prednisone* be given at a daily single dose of 1 mg/kg (maximum 80 mg) or alternate-day dose of 2 mg/kg (maximum 120 mg). (2C)

*Prednisone or prednisolone

6.2: Initial treatment of FSGS

6.2.3: We suggest the initial high dose of corticosteroids be given for a minimum of 4 weeks; continue high-dose corticosteroids up to a maximum of 16 weeks, as tolerated, or until complete remission has been achieved, whichever is earlier. (2D)

6.2.4: We suggest corticosteroids be tapered slowly over a period of 6 months after achieving complete remission. (2D)

6.2: Initial treatment of FSGS

6.2.5: We suggest CNIs be considered as first-line therapy for patients with relative contra-indications or intolerance to high-dose corticosteroids (e.g., uncontrolled diabetes psychiatric conditions, severe osteoporosis). (2D)

6.3: Treatment for relapse

6.3.1: We suggest that a relapse of nephrotic syndrome is treated as per the recommendations for relapsing MCD in adults (see Chapters 5.1 and 5.2). (2D)

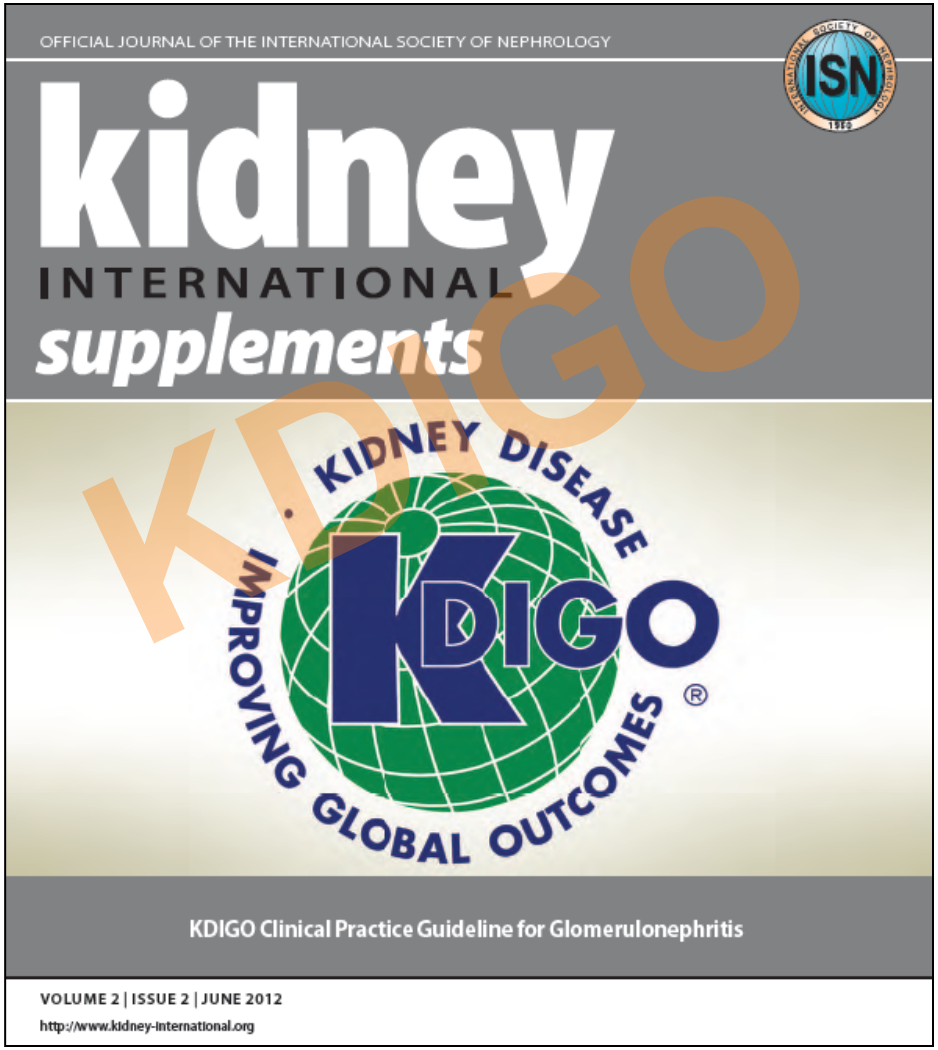
6.4: Treatment for steroid-resistant FSGS

6.4.1: For steroid-resistant FSGS, we suggest that cyclosporine at 3–5 mg/kg/d in divided doses be given for at least 4–6 months. (2B)

6.4.2: If there is a partial or complete remission, we suggest continuing cyclosporine treatment for at least 12 months followed by a slow taper. (2D)

6.4.3: We suggest that patients with steroid-resistant FSGS , who do not tolerate cyclosporine, be treated with a combination of mycophenolate mofetil and high-dose dexamethasone. (2C)

Chapter 3: Steroid-sensitive nephrotic syndrome in children



KDIGO definitions in children

Classification	Definition
Nephrotic syndrome	Edema & uPCR ≥2000 mg/g* or 3+ dipstick & serum albumin <2.5 g/dL
Complete remission	uPCR <200 mg/g or <1+ dipstick for 3 days
Partial remission	Proteinuria ↓50% from the presenting value & uPCR 200−2000 mg/g
Initial responder	Complete remission within 4 weeks of therapy
Steroid dependent	Two consecutive relapses during therapy, or within 14 days of ceasing therapy
Frequent relapsing	Two or more relapses within 6 months of initial response, or ≥4 relapses in any 12-month period
Steroid resistant	Failure to achieve complete remission after 8 weeks of therapy

uPCR – urine protein creatinine ratio (mg protein / g creatinine)

*Equivalent to ≥3.5 g/24 hours

Definitions of remission in children

	JSN	KDIGO
Complete	<0.3 g/d	<0.2 g/g
Incomplete I *or* Partial	0.3 –1.0 g/d	0.2 – 2.0 g/g
Incomplete II *or* Partial	1.0 – 3.5 g/d	0.2 – 2.0 g/g

Can I ask you a question:

A) I am a pediatric nephrologist

B) I am an adult nephrologist and never see children

C) I am an adult nephrologist and see children occasionally

D) I am an adult nephrologist and see children on a routine basis (belongs to my tasks)

Now its becoming tough !

7 minutes

3.1: Treatment of the initial episode of SSNS

3.1.1: We recommend that corticosteroid therapy (prednisone or prednisolone) be given for at least 12 weeks. (1B)

3.1.1.1: We recommend that oral prednisone be administered as a single daily dose (1B) starting at 60 mg/m^2/d or 2 mg/kg/d to a maximum 60 mg/d.(1D)

3.1.1.2: We recommend that daily oral prednisone be given for 4–6 weeks (1C) followed by alternate-day medication as a single daily dose starting at 40 mg/m^2 or 1.5 mg/kg (maximum 40 mg on alternate days) (1D) and continued for 2–5 months with tapering of the dose. (1B)

3.2: Treatment of relapsing SSNS with corticosteroids (1)

3.2.1: Corticosteroid therapy for children with infrequent relapses of SSNS:

3.2.1.1: We suggest that infrequent relapses of SSNS in children be treated with a single-daily dose of prednisone 60 mg/m^2 or 2 mg/kg (maximum of 60 mg/d) until the child has been in complete remission for at least 3 days. (2D)

3.2.1.2: We suggest that, after achieving complete remission, children be given prednisone as a single dose on alternate days (40 mg/m^2 per dose or 1.5 mg/kg per dose: maximum 40 mg on alternate days) for at least 4 weeks. (2C)

3.2: Treatment of relapsing SSNS with corticosteroids (2)

3.2.2: Corticosteroid therapy for frequently relap-sing (FR) and steroid-dependent (SD) SSNS:

3.2.2.1: We suggest that relapses in children with FR or SD SSNS be treated with daily prednisone until the child has been in remission for at least 3 days, followed by alternate-day prednisone for at least 3 months. (2C)

3.2.2.2: We suggest that prednisone be given on alternate days in the lowest dose to maintain remission without major adverse effects in children with FR and SD SSNS. (2D)

3.2: Treatment of relapsing SSNS with corticosteroids (3)

3.2.2: Corticosteroid therapy for frequently relapsing (FR) and steroid-dependent (SD) SSNS:

3.2.2.3: We suggest that daily prednisone at the lowest dose be given to maintain remission without major adverse effects in children with SD SSNS where alternate-day prednisone therapy is not effective. (2D)

3.2.2.4: We suggest that daily prednisone be given during episodes of upper respiratory tract and other infections to reduce the risk for relapse in children with FR and SD SSNS already on alternate-day prednisone. (2C)

3.3: Treatment of FR and SD SSNS with corticosteroid sparing agents (1)

3.3.1: We recommend that corticosteroid-sparing agents be prescribed for children with FR SSNS and SD SSNS, who develop steroid related adverse effects. (1B)

3.3.2: We recommend that alkylating agents, cyclophosphamide or chlorambucil, be given as corticosteroid-sparing agents for FR SSNS. (1B) We suggest that alkylating agents, cyclophosphamide or chlorambucil, be given as corticosteroid-sparing agents for SD SSNS. (2C)

3.3: Treatment of FR and SD SSNS with corticosteroid sparing agents (2)

3.3.2.1: We suggest that cyclophosphamide (2 mg/kg/d) be given for 8–12 weeks (maximum cumulative dose 168 mg/kg). (2C)

3.3.2.2: We suggest that cyclophosphamide not be started until the child has achieved remission with corticosteroids. (2D)

3.3.2.3: We suggest that chlorambucil (0.1– 0.2 mg/kg/d) may be given for 8 weeks (maximum cumulative dose 11.2 mg/kg) as an alternative to cyclophosphamide. (2C)

3.3.2.4: We suggest that second courses of alkylating agents not be given. (2D)

3.3: Treatment of FR and SD SSNS with corticosteroid sparing agents (3)

3.3.3: We recommend that levamisole be given as a corticosteroid-sparing agent. (1B)

3.3.3.1: We suggest that levamisole be given at a dose of 2.5 mg/kg on alternate days (2B) for at least 12 months (2C) as most children will relapse when levamisole is stopped.

3.3.4: We recommend that the calcineurin inhibitors cyclosporine or tacrolimus be given as corticosteroid-sparing agents. (1C)

3.3: Treatment of FR and SD SSNS with corticosteroid sparing agents (4)

3.3.4.1: We suggest that cyclosporine be administered at a dose of 4–5 mg/kg/d (starting dose) in two divided doses. (2C)

3.3.4.2: We suggest that tacrolimus 0.1 mg/kg/d (starting dose) given in two divided doses be used instead of cyclosporine when the cosmetic side-effects of cyclosporine are unacceptable. (2D)

3.3.4.3: Monitor CNI levels during therapy to limit toxicity. (Not Graded)

3.3.4.4: We suggest that CNIs be given for at least 12 months, as most children will relapse when CNIs are stopped. (2C)

3.3: Treatment of FR and SD SSNS with corticosteroid sparing agents (5)

3.3.5: We suggest that MMF be given as a corticosteroid-sparing agent. (2C)

3.3.5.1: We suggest that MMF (starting dose 1200 mg/m^2/d) be given in two divided doses for at least 12 months, as most children will relapse when MMF is stopped. (2C)

3.3: Treatment of FR and SD SSNS with corticosteroid sparing agents (6)

3.3.6: We suggest that rituximab be considered only in children with SD SSNS who have continuing frequent relapses despite optimal combinations of prednisone and corticosteroid-sparing agents, and/or who have serious adverse effects of therapy. (2C)

3.3.7: We suggest that mizoribine not be used as a corticosteroid-sparing agent in FR and SD SSNS. (2C)

3.3.8: We recommend that azathioprine not be used as a corticosteroid-sparing agent in FR and SD SSNS. (1B)

3.3: Treatment of FR and SD SSNS with corticosteroid sparing agents

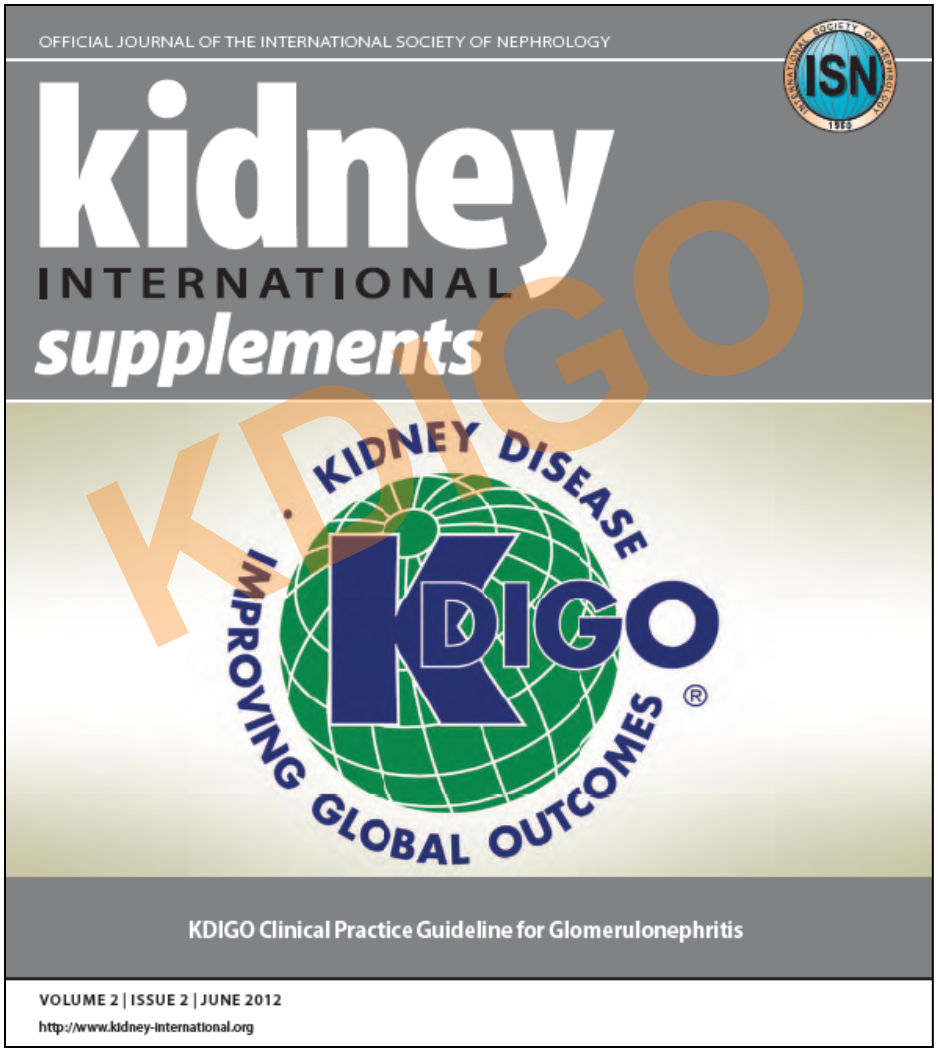
Agent	Advantages	Disadvantages
Cyclophosphamide	Prolonged remission Inexpensive	Less effective in SD, Serious AE's, Monitor counts, Only 1 course
Chlorambucil	Prolonged remission Inexpensive	Less effective in SD, Serious AE's, Monitor counts, Only 1 course
Levamisole	Few AE's Inexpensive	Continued treatment required, Limited availability
Cyclosporine	Prolonged remissions in some SD	Continued treatment required, Nephrotoxic, Expensive
Tacrolimus	Prolonged remissions in some SD	Continued treatment required, Nephrotoxic, Diabetes, Expensive
Mycophenolate mofetil	Prolonged remissions in some SD/FR, Few AE's	Continued treatment required, Less effective, Expensive

3.4: Indication for kidney biopsy

3.4.1: Indications for kidney biopsy in children with SSNS are (Not Graded):

- late failure to respond following initial response to corticosteroids;
- a high index of suspicion for a different underlying pathology;
- decreasing kidney function in children receiving CNIs.

Chapter 4: Steroid-resistant nephrotic syndrome in children



The NEW ENGLAND JOURNAL of MEDICINE

BRIEF REPORT

Abatacept in B7-1–Positive Proteinuric Kidney Disease

Chih-Chuan Yu, M.Sc., Alessia Fornoni, M.D., Ph.D., Astrid Weins, M.D., Ph.D., Samy Hakroush, M.D., Dony Maiguel, Ph.D., Junichiro Sageshima, M.D., Linda Chen, M.D., Gaetano Ciancio, M.D., Mohd. Hafeez Faridi, Ph.D., Daniel Behr, Kirk N. Campbell, M.D., Jer-Ming Chang, M.D., Hung-Chun Chen, M.D., Jun Oh, M.D., Christian Faul, Ph.D., M. Amin Arnaout, M.D., Paolo Fiorina, M.D., Ph.D., Vineet Gupta, Ph.D., Anna Greka, M.D., Ph.D., George W. Burke III, M.D., and Peter Mundel, M.D.

N Engl J Med. 2013;369:2416-2423

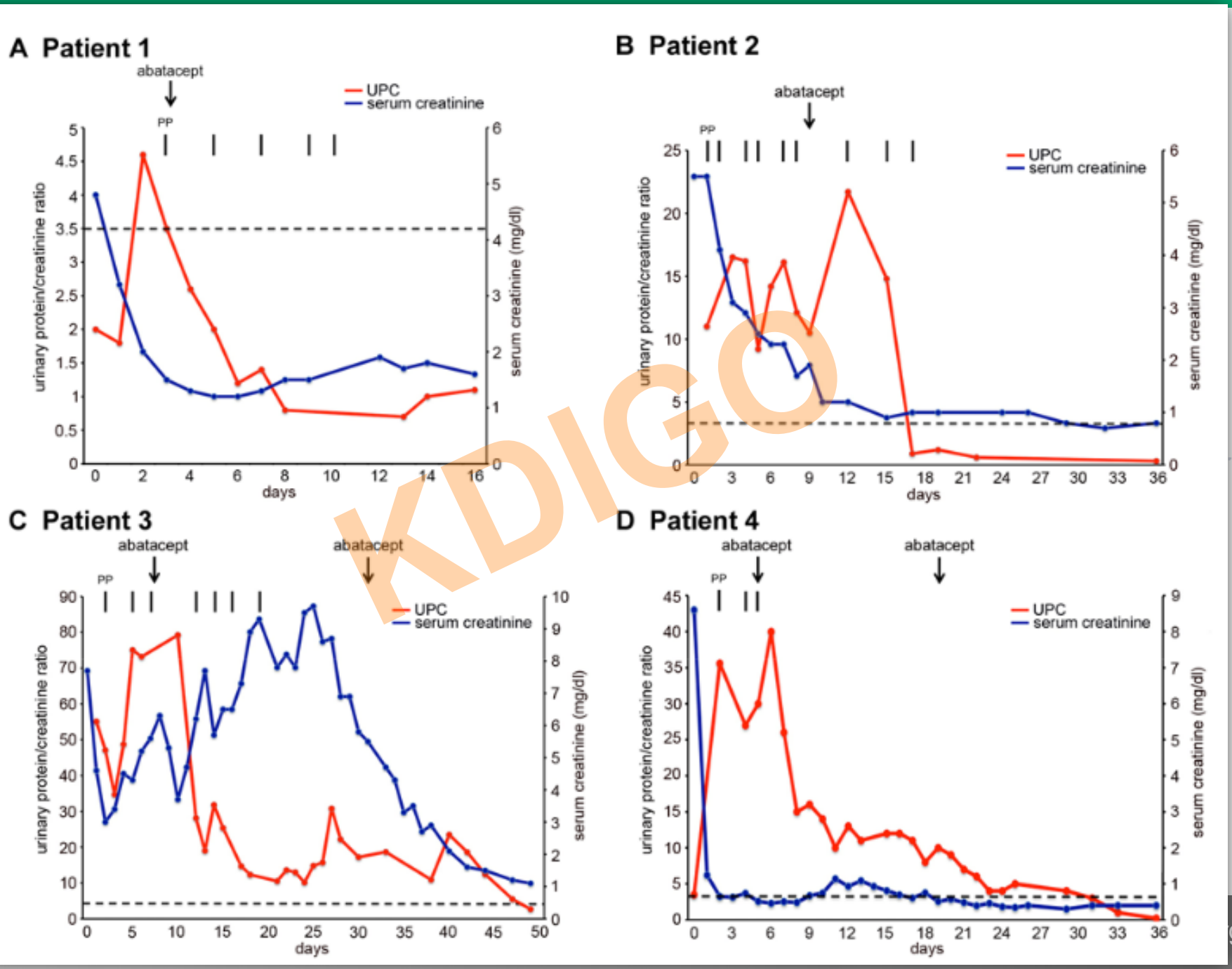
Abatacept (cytotoxic T-lymphocyte associated antigen4-imunoglobulin fusion protein [CTLA-4-Ig]) is a costimula-tory inhibitor of B7-1 (CD80 – marker for podocyte damage).

5 patients (7-28 y) with FSGS (4 recurrent after KTX- 2xLD) and proteinuria + immunhistology pos. for B7-1 in podocytes. Immunosuppression with daclizumab-rituximab/thymoglobulin induction, TAC, MMF, steroids and plasmapheresis therapy.

Abatacept single dose (10 mg/kg)

Result: complete remission (< 0.5 g/g)

Our data indicate that abatacept may stabilize β1-integrin activation in podocytes and reduce proteinuria in patients with B7-1–positive glomerular disease.


A Patient 1
abatacept
PP
UPC
serum creatinine
urinary protein/creatinine ratio
serum creatinine (mg/dl)
days
B Patient 2
abatacept
PP
UPC
serum creatinine
urinary protein/creatinine ratio
serum creatinine (mg/dl)
days
C Patient 3
abatacept
abatacept
PP
UPC
serum creatinine
urinary protein/creatinine ratio
serum creatinine (mg/dl)
days
D Patient 4
abatacept
abatacept
PP
UPC
serum creatinine
urinary protein/creatinine ratio
serum creatinine (mg/dl)
days

The NEW ENGLAND JOURNAL of MEDICINE

EDITORIAL

PROTEINURIA

Abate or applaud abatacept in proteinuric kidney disease?

Jochen Reiser and Nada Alachkar

T-lymphocyte activation antigen CD80 is a B-cell costimulator and podocyte injury marker originally described in lupus nephritis; CD80 blockade with abatacept disappointed in a lupus nephritis trial. A study now suggests abatacept efficacy in focal and segmental glomerulosclerosis. Small patient numbers and concurrent treatment regimens call for more definitive studies regarding this therapeutic strategy.

Reiser, J. & Alachkar, N. *Nat. Rev. Nephrol.* **10**, 128–130 (2014); published online 24 December 2013; doi:10.1038/nrneph.2013.276

4.1: Evaluation of children with SRNS

4.1.1: We suggest a minimum of 8 weeks treatment with corticosteroids to define steroid resistance. (2D)

4.1.2: The following are required to evaluate the child with SRNS (Not Graded):

- a diagnostic kidney biopsy;
- evaluation of kidney function by GFR or eGFR;
- quantitation of urine protein excretion.

4.2: Treatment recommendations for SRNS (1)

4.2.1: We recommend using a calcineurin inhibitor (CNI) as initial therapy for children with SRNS. (1B)

4.2.1.1: We suggest that CNI therapy be continued for a minimum of 6 months and then stopped if a partial or complete remission of proteinuria is not achieved. (2C)

4.2.1.2: We suggest CNIs be continued for a minimum of 12 months when at least a partial remission is achieved by 6 months. (2C)

4.2.1.3: We suggest that low-dose corticosteroid therapy be combined with CNI therapy. (2D)

4.2: Treatment recommendations for SRNS (2)

4.2.2: We recommend treatment with ACE-I or ARBs for children with SRNS. (1B)

4.2.3: In children who fail to achieve remission with CNI therapy:

4.2.3.1:We suggest that mycophenolate mofetil (2D), high-dose corticosteroids (2D), or a combination of these agents (2D) be considered in children who fail to achieve complete or partial remission with CNIs and corticosteroids.

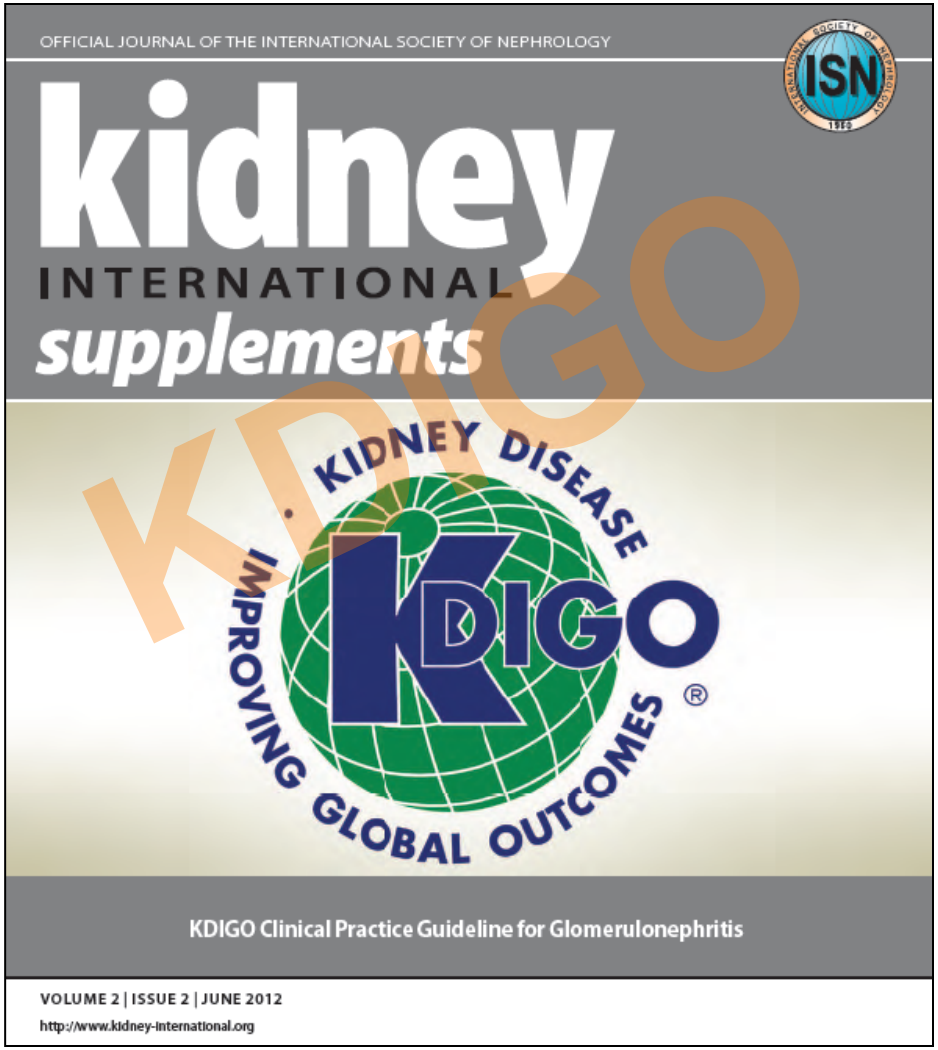
4.2.3.2: We suggest that cyclophosphamide not be given to children with SRNS. (2B)

4.2: Treatment recommendations for SRNS (3)

4.2.4: In patients with a relapse of nephrotic syndrome after complete remission, we suggest that therapy be restarted using any one of the following options: (2C)

- oral corticosteroids (2D);
- return to previous successful immunosuppressive agent (2D);
- an alternative immunosuppressive agent to minimize potential cumulative toxicity (2D).

Thank you!


OFFICIAL JOURNAL OF THE INTERNATIONAL SOCIETY OF NEPHROLOGY
ISN
kidney
INTERNATIONAL
supplements
KIDNEY DISEASE
IMPROVING GLOBAL OUTCOMES
KDIGO
KDIGO Clinical Practice Guideline for Glomerulonephritis
VOLUME 2 | ISSUE 2 | JUNE 2012
http://www.kidney-international.org