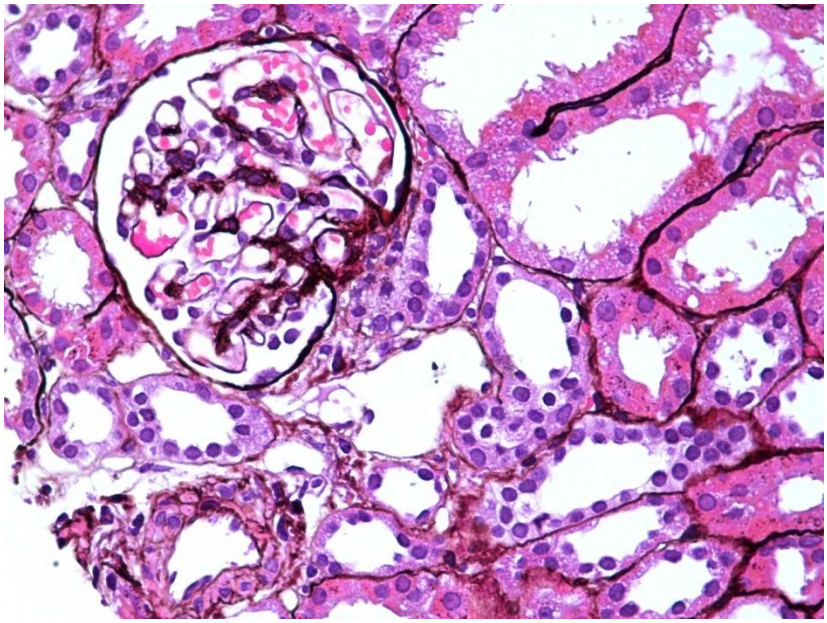
Renal biopsy teaching series

Case 1.

Here is a representative image from a renal biopsy done on a 4-year-old male child with steroid dependant nephrotic syndrome since 2 years of age. No haematuria. No other diseases. No family history of renal disease.



This shows a high-power view of one representative area of renal biopsy from the above patient with one glomerulus which is apparently normal on light microscopy. Surrounding parenchyma is also unaffected. The tubules are back-to-back. One arteriole is also seen in lower right corner showing no vasculopathy. In short, this biopsy appearance qualifies for a diagnosis of minor glomerular abnormalities. (Jones' methenamine silver stain, ×400).

Discussion

The glomerulus in the above case apparently shows no significant pathology on light microscopy (LM). There is no increase in endocapillary or extracapillary cellularity. Capilllary lumena are patent. Capillary walls are thin and delicate. There are no spikes on glomerular basement membrane (GBM). There is no segmental lesion. There is no adhesion formation (synechiae formation) anywhere in the glomerular tuft except at the vascular pole, which is where the glomerulus is attached to the surrounding Bowman's capsule. This morphological appearance is referred to as minor glomerular lesions on light microscopy (LM). However, this morphology, on its own, is not synonymous with a diagnosis of minimal change disease (MCD). Minor changes can be seen in a variety of renal diseases, including early stages of many primary and secondary renal disorders (Table 1). The differential diagnosis is focused to and driven by the clinical presentation of the disease. In this particular case, the diagnosis of MCD will be on the top of the

differential diagnostic list. However, a firm diagnosis of the disease will require a correlative approach along with a negative immunofluorescence (IF) and confirmatory electron microscopy (EM). The diagnostic consideration would be different if the child suffered from macroscopic or microscopic haematuria, for example. An important morphologic feature favoring MCD diagnosis in such cases is clear lack of significant changes in other components of renal parenchyma, i.e., tubules, blood vessels and interstitium. Presence of mild focal tubular atrophy or arteriolopathy will, for example, exclude a diagnosis of MCD. A definitive diagnosis requires correlation of all data from clinical presentation, laboratory, serology, LM, immunofluorescence (IF) and in some cases, electron microscopy (EM). In resource-poor countries, a quality IF service is can go a long way to establish diagnosis of renal diseases in a vast majority of cases.

Take home points

- Minor changes on LM do not equate with a diagnosis of MCD. These have a long differential diagnostic list.
- For a definitive diagnosis of renal disease, a correlation of all clinical, laboratory and pathologic data is imperative.
- In the absence of EM, IF plays a crucial role in narrowing down the differential diagnosis of minor glomerular abnormalities seen on LM.

Table 1. Differential diagnosis of minor glomerular abnormalities on light microscopy (LM).

Minimal change disease (MCD)
Early-stage focal segmental glomerulosclerosis (FSGS)
Prespike membranous GN
Early-stage amyloidosis
IgA nephropathy
IgM nephropathy
Alport’ syndrome
Thin basement membrane disease
Lupus nephritis class I