Injection of Amniotic Fluid Stem Cells Delays Progression of Renal Fibrosis.

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Public Summary:
Injection of amniotic fluid stem cells ameliorates the acute phase of acute tubular necrosis in animals by promoting proliferation of injured tubular cells and decreasing apoptosis, but whether these stem cells could be of benefit in CKD is unknown. Here, we used a mouse model of Alport syndrome, Col4a5(-/-) mice, to determine whether amniotic fluid stem cells could modify the course of progressive renal fibrosis. Intracardiac administration of amniotic fluid stem cells before the onset of proteinuria delayed interstitial fibrosis and progression of glomerular sclerosis, prolonged animal survival, and ameliorated the decline in kidney function. Treated animals exhibited decreased recruitment and activation of M1-type macrophages and a higher proportion of M2-type macrophages, which promote tissue remodeling. Amniotic fluid stem cells did not differentiate into podocyte-like cells and did not stimulate production of the collagen IVa5 needed for normal formation and function of the glomerular basement membrane. Instead, the mechanism of renal protection was probably the paracrine/endocrine modulation of both profibrotic cytokine expression and recruitment of macrophages to the interstitial space. Furthermore, injected mice retained a normal number of podocytes and had better integrity of the glomerular basement membrane compared with untreated Col4a5(-/-) mice. Inhibition of the renin-angiotensin system by amniotic fluid stem cells may contribute to these beneficial effects. In conclusion, treatment with amniotic fluid stem cells may be beneficial in kidney diseases characterized by progressive renal fibrosis.

Scientific Abstract:
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