

Comment on: Long-term hemodialysis improved and stabilized diabetic macular edema: two case reports

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Dear Editor,

With great excitement, we read the article titled “Long-term hemodialysis improved and stabilized diabetic macular edema: two case reports” by Fan and Yuan^[1]; a case series study which provided interesting novel insights into the beneficial effect of hemodialysis (HD) on diabetic macular edema (DME). Although we congratulate the authors for a valuable case presentation, we feel that their study did not mention the mechanism by which it suppresses the pathogenesis of DME. Therefore, we would like to provide supplementary comments through many years of our research regarding the association between diabetic eye disease and HD.

In general, patients with end-stage diabetic kidney disease who crucially need HD are likely to have fluid overload^[2]. Under the condition of fluid overload, an imbalance between the colloid osmotic and the hydrostatic pressures favors fluid movement from the vascular to the extravascular compartment, as stated in Starling’s principle^[3]. Thus, patients with fluid overload and microvasculopathy due to the long-term effects of diabetes might readily suffer from exacerbation of DME, possibly resulting from the increased retinal vascular permeability^[4]. However, the initiation of HD, such as in the study by Fan and Yuan^[1], ameliorated the conditions associated with fluid overload, resulting in the resolution of DME. Takamura *et al*’s^[5] multicenter study including 132 eyes during the 12-month period after HD initiation reported that the anatomical and functional outcomes of DME significantly

improved immediately after initiation and were maintained until the end of the study period. Hence, HD as a treatment for fluid retention is an important therapeutic option for patients with DME and fluid overload due to end-stage diabetic kidney disease. Incidentally, this mechanism can be applied to other medical treatments. Kameda *et al*’^[4] and Ciardella^[6] reported cases, with fluid overload and extensive DME, who experienced marked improvement in DME after only strict medical treatment including administration of furosemide.

In contrast, many ophthalmologists are concerned that starting HD in patients with advanced stage of diabetic retinopathy could have a higher risk of subsequent vitreous hemorrhage (VH), as HD requires systemic anticoagulation with unfractionated heparin. However, somewhat surprisingly, HD might suppress the pathogenesis of VH, as well as DME. In our previous study, including 145 eyes during the 12-month period before and after HD initiation, the incidence of VH was significantly lower in the HD stage than in the pre-HD stage^[7]. Moreover, our recent study reported that HD has a beneficial impact on vitrectomy outcomes; the 6-month incidence of VH and neovascular glaucoma following vitrectomy for proliferative diabetic retinopathy was significantly lower in the HD group than in the stages 3-5 chronic kidney disease group (in patients not on HD)^[8]. Based on these reports, we believe that HD may play a significant role as a “game-changer” in various situation of diabetic eye disease, and the cases of Fan and Yuan’s^[1] study confirmed our hypothesis.

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REFERENCES

- 1 Fan W, Yuan RD. Long-term hemodialysis improved and stabilized diabetic macular edema: two case reports. *Int J Ophthalmol* 2021;14(3):472-475.
- 2 Tsai YC, Tsai JC, Chiu YW, Kuo HT, Chen SC, Hwang SJ, Chen TH, Kuo MC, Chen HC. Is fluid overload more important than diabetes in renal progression in late chronic kidney disease? *PLoS One* 2013;8(12):e82566.
- 3 Starling EH. On the absorption of fluids from the connective tissue spaces. *J Physiol* 1896;19(4):312-326.
- 4 Kameda Y, Hirose A, Iida T, Uchigata Y, Kitano S. Giant retinal pigment epithelial tear associated with fluid overload due to end-stage diabetic kidney disease. *Am J Ophthalmol Case Rep* 2017;5:44-47.
- 5 Takamura Y, Matsumura T, Ohkoshi K, Takei T, Ishikawa K, Shimura M, Ueda T, Sugimoto M, Hirano T, Takayama K, Gozawa M, Yamada Y, Morioka M, Iwano M, Inatani M. Functional and anatomical changes in diabetic macular edema after hemodialysis initiation: one-year follow-up multicenter study. *Sci Rep* 2020;10(1):7788.
- 6 Ciardella AP. Partial resolution of diabetic macular oedema after systemic treatment with furosemide. *Br J Ophthalmol* 2004;88(9):1224-1225.
- 7 Kameda Y, Hanai K, Uchigata Y, Babazono T, Kitano S. Vitreous hemorrhage in diabetes patients with proliferative diabetic retinopathy undergoing hemodialysis. *J Diabetes Invest* 2020;11(3):688-692.
- 8 Kameda Y, Saeki T, Hanai K, Suzuki Y, Uchigata Y, Babazono T, Kitano S. Is chronic kidney disease affecting the postoperative complications of vitrectomy for proliferative diabetic retinopathy? *J Clin Med* 2021;10(22):5309.