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Effect of hemoperfusion with deferoxamine administration on ferritin levels in a thalassemia patient with iron overload

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Case Study : Patients with transfusion-related iron overload usually require iron chelation therapy to decrease their iron burden. Deferoxamine (DFO), however, may not be able to chelate iron directly from its body stores. We investigated whether ferritin and transferrin are removed by hemoperfusion (HP). Total 4,500mg of intravenous (IV) DFO (30mg/kg/day) was continuously administered to a 36-old-female thalassemia patient for 72 hours. The basal level of ferritin increased from 2,583 ng/ml to 5,888 ng/mL after 72 hours of DFO administration. The ferritin levels were slightly increased to 6,025, after 72 hours of cessation of DFO administration. Then, chelation therapy was performed as follows: The therapy was consisted of IV administration of 1,500mg DFO (30mg/kg/day) for 24 hours for 5 consecutive days, followed by 2 days off. During the 5 consecutive days, HP was applied every other day (One set of chelation therapy). A total of 36 sessions of HP (12 sets of chelation therapy) were performed during 12 weeks. To observe the time-base change of ferritin, iron, and TIBC during the HP procedure, these parameters were measured hourly in the first four sessions, during each HP session. The levels of parameters were measured before and after HP in each of the 36 sessions of HP to compare the pre-and post-HP values. The results show that ferritin, iron, and TIBC levels decreased significantly within the first hour ($P < 0.05$), and that iron ($P < 0.001$) and TIBC ($P < 0.001$) levels were decreased after HP, but ferritin level was not. Consequently, the ferritin level decreased from 6,025 ng/ml, the highest level, to 2,025 ng/ml after 12 weeks of treatment (See a supplementary figure). The result in this study imply that, in patients with severe iron overload, HP can be an effective tool to directly remove circulating ferritin and transferrin.

Keywords : Chelation; deferoxamine; ferritin; hemoperfusion; iron overload; thalassemia