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## The wound management of HD patients (DM foot)

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Diabetic foot ulcers cannot often be achieved successfully wound healing, because of the involvement of multiple factors. Diabetic ulcers show different characteristics depending on the patient. Application of only one method may result in solutions that may not match the patient's specific requirements. It is therefore imperative that the most problematic matter should be identified according to each patient.

There are four representative factors that make it difficult to treat patients with diabetic ulcers. These four factors are termed VIPS. The letters stand for Vascularity, Infection, Pressure, and Source of healing (cell function for wound healing).

- **Vascularity:** Diabetic patients are often accompanied by atherosclerosis in the blood vessels. This eventually leads to the insufficiency of the intravascular space where blood circulates. Due to the insufficiency of blood supply, the cells around the wound given insufficient oxygen or other nutrients that are essential for cell activity.  
**Infection:** In case of infection, oxygen or nutrients that normal skin cells should use in the wound healing process are deprived by bacteria. Toxins released by these bacteria degrade normal tissue or regenerated proteins. Unless a complete cure of the infections is achieved, wound healing cannot be achieved. Since the activities of inflammatory cells are generally attenuated due to diabetes, wound infection of diabetic foot usually spreads fast particularly in cases with poor vascularity.  
**Pressure:** In patients with diabetes, functional abnormalities occur in the nervous system with variability in the severity or symptoms. Due to the degeneration of the motor nerve, there would be changes in the foot arches resulting in deformity to the shape of the foot and toes. Because of this, pressure is exerted to some parts of the foot during gait. Accordingly, this leads to the progression of skin necrosis. Moreover, due to the degeneration of the sensory nerve, sensory functions are also impaired. This lead to the possibility that the pressure injury on the foot due to gait or shoes cannot be detected as earliest as possible but diagnosed only when skin necrosis has already far advanced.  
**Source of healing:** For successful wound healing, the key cells for the wound healing should have satisfactory activities. These cells release various cytokines and thereby regulate the wound healing process. In diabetic patients, however, cells have notably decreased mitotic activity compared with normal healthy controls. Because of this, there are often cases in which the wound healing process is interfered.

There are myriads of characteristics of diabetic ulcer that are different from those of general wounds. Accordingly, the treatment of diabetic ulcer should be carefully treated. Accurate identification of the causes and the appropriate treatments are therefore be mandatory to obtain the best treatment.