

## The Role of Negative Pressure Wound Therapy (NPWT) as an Immunomodulator in Necrotizing Fasciitis

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Received Date: Oct 30, 2017; Accepted Date: Oct 30, 2017; Published Date: Nov 08, 2017

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Citation: Ozkan OF, Yuksekdag S, Goret CC (2017) The Role of Negative Pressure Wound Therapy (NPWT) as an Immunomodulator in Necrotizing Fasciitis. J Med Microbiol Immunol Res 1:e104.

### Editorial

Necrotizing fasciitis (NF) is a severe infectious disease which is generally fulminant progressive with a high morbidity and mortality rate. NF is a synergetic infectious disease and usually reason is polymicrobial (both aerobic and anaerobic organisms) and affects the small vessels with thrombosis. All age groups can be affected with a male dominance. The predisposing factors have been well described and including history of trauma, crush injuries, cancer, and autoimmune diseases. Immediate debridement of all necrotic tissues, usage of broad-spectrum antibiotics and management of underlying diseases are the main cornerstones for management of disease [1-3].

After microbial invasion of tissue in such conditions, pathogens release exotoxins and endotoxins and this led to an increase the secretion of cytokines in the soft tissue and the infection consequently spreads to deep fascial tissues. The roles of inflammatory cells, cytokines, chemokines and gene regulation have been extensively studied. As a result, poor microcirculation, ischemia, cell death, and necrosis occur. Bacteria simultaneously cause coagulation by inducing platelet aggregation and activation of complement system. Anaerobic microorganisms cause formation of thrombosis by producing enzymes, especially collagenase and heparinase and this situation leads to bacterial overgrowth in deep fascia, infiltration of polymorphonuclear leucocytes, thrombosis in the veins and finally necrosis occur [3-5].

The medical management of Fournier's gangrene shows similarity to the treatment of severe sepsis. Stabilization of the hemodynamics is the first step. Following debridement, the wound management is also essential for NF. A conventional wet-to-dry dressing is one of the well-known and accepted methods. This has few disadvantages such as frequent requirement of change, as a second, a relatively new choice, described as Negative Pressure Wound Therapy (NPWT) has been used in the wound management of NF. Once the necrosis is ended, NPWT helps wound healing physiologically. The negative pressure leads to an increased blood supply,

increasing tissue perfusion, reducing edema, absorbs fluids and exudes, inhibit infection and as a last dry the wound and thus migration of inflammatory cells into the wound region. By this way, it promotes and accelerates the formation of granulation tissue by the removal of bacterial contamination and exudates [1-4].

A study demonstrated the positive effects of NPWT on serum fibronectin levels, which is an adhesion molecule, promoting the migration of inflammatory cells and remodeling phases. NPWT accelerates wound healing by promoting angiogenesis with the over-expression of angiogenin-1, Tie-2,  $\alpha$ -SMA and collagen type IV [5]. In recent years a new pathway described that NPWT devices also promotes muscle-derived stem cell osteogenic differentiation through MAPK pathway immunologically [6].

In conclusion, NF is a quickly developing, life-threatening infection that affects the soft tissue and fascia. The roles of inflammatory cells, cytokines, chemokines, and gene regulation have been extensively studied. In future new pathways will described to explain the positive effect on microcirculation by angiogenesis, and formation of good-quality granulation tissue.

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