Microbiome Dysbiosis Dominated by Rhodococcus Occurs in Keloids

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Background:

Keloid is a pathological scar that grows like a tumor.Previous studies revealed that chronic inflammation in keloid contributes to its formation, however, the mechanism is poorly understood.

Objective:

Currently, numerous inflammatory diseases are correlated with microbiome dysbiosis, therefore, this study aims to investigate the presence of microbiome dysbiosis in keloids and its potential correlation with keloid formation.

Methods:

A total of 35 keloid and 36 normal skin (NS) samples were collected, and the keloid severity was evaluated using Vancouver Scar Scale (VSS)score. The microbiota in the tissues was assessed by 16S rRNA sequencing, followed by an investigation into the correlation between microbiota and clinic indices. In addition, 10 keloid and 10 NS samples were dissociated into single cells, and flow cytometry was used to analyze the proportion of T cells in keloids and NS tissues.

Results:

The richness of the bacteria community in keloid was significantly reduced than that in NS. Additionally, the microbiota composition in keloid was different from that in NS. At the phylum level, *Firmicutes* was significantly higher in keloid than in NS, while *Rhodococcus* was the dominant species in keloid at the genus level. *Acinetobacter*, was also found to be positively correlated with keloid formation. Furthermore, *Rhodococcus* demonstrated a higher predictive value for keloid severity than *Acinetobacter*. Interestingly, the bacterial composition varies during keloid progression. Compared to keloids<10 years, the proportion of genus *Rhodococcus* reduced significantly in keloids ⩾10 years, while the proportion of genus *Cutibacterium* significantly increased compared to keloids<10 years.The proportion of CD4 + and CD8 +T cells in keloid scar tissues was also significantly decreased compared with NS.

Conclusion:

Microbiome dysbiosis occurring in keloids was dominated by *Rhodococcus*, which may be correlated with the reductionof CD4+ and CD8+T cells. Targeting microbiome dysbiosis may be a prospective approach future keloid management.

Keywords:

Microbiome dysbiosis; Keloid; Inflammation; Vancouver Scar score; *Rhodococcus*