

BÖLÜM 10.2.8

YARADA BİYOFİLM OLUŞUMU VE ENGELLENMESİ

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BİYOFİLM TANIMI

Cansız ya da canlı yüzeylere geri dönüşümsüz olarak tutunarak çoğalan mikroorganizmaların ekstrasellüler polimerik yapıdaki (EPS) matriks (slime) içinde, birbirleriyle haberleşme, gen transkripsiyonu gibi özellikleri ile planktonik mikroorganizmalara göre daha farklı bir fenotip kazanarak oluşturduğu mikroorganizma topluluğudur (1). EPS matrisi öncelikle mikroorganizmaları oluşturan biyofilm tarafından üretilir; ilki özellikle nükleik asitler, hücre dışı proteinler, fosfolipidler, teikoik asit ve ekzopolisakaritlerden oluşur (2).

Biyofilm Prevelansı

Kronik yaralar, cerrahi alanla ilişkili yaraları, travmatik yaraları, diyabetik ayak ülserlerini, basınç ülserlerini ve venöz vasküler ayak ülserlerini içerir.

Son yıllarda giderek artan bilimsel veriler, enfeksiyonun ve özellikle yarada biyofilm oluşumunun yara iyileşmesini geciktiren sıradan bir neden olmadığını, çok önemli bir rol oynadığını ve yarayı tek başına kronikleştiren bir faktör olduğunu göstermektedir. Bu nedenle Biyofilmler çoğu kronik yarada bulunur (3). Bu Kronik ya-

ralar genellikle iyileşmenin inflamatuvar fazında duraklama ile karakterizedir ve sıklıkla bakteriyel enfeksiyonlar eşlik etmektedirler. Kronik yaralardaki bakteriler sıklıkla biyofilmle birlikte bulunur. Kronik yaralardaki bakterilerin varlığı, tek başına biyofilm oluşumunun göstergesi değildir. Ancak kronik yaralarda bulunan mikroorganizmaların çoğunun, özellikle de *Pseudomonas* spp ve *Staphylococcus* spp gibi türlerin, yüksek düzeyde biyofilm ürettikleri bilinmektedir (4,5). Mottola ve ark. 48 saatlik inkübasyon sonrası *Pseudomonas* spp türlerinde güçlü (%85.7) veya orta (%14.3) düzeyde biyofilm oluşumunu göstermişlerdir (6). *Staphylococcus* spp türlerinde ise suşların % 84.4'ünün 72 saat sonunda orta düzeyde biyofilm oluşturduğu saptanmıştır. Diyabetik ayak enfeksiyonlarından izole edilen *S. aureus* suşlarının % 69'unun ve *S. epidermidis* suşlarının %75'inin biyofilm oluşturduğunu bildirmiştir (7). Kronik yara ile ilgili yayınlanmış derlemede kronik yarada biyofilm prevelansı %78.2 ($p<0.002$) saptanmıştır. Bu derlemeye alınan 8 çalışmadan üçünde sıklık %60, diğer altı yayında ise %100 bildirilmiştir (8). Diyabetik ayak enfeksiyonlarında biyofilm oluşturma oranı da %82.7 belirlenmiştir (9).

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sitesi azdır. Biyofilm konsantrasyonunu ve inflamasyonu azaltır , iyileşmeyi hızlandırır (93).

Bal: Bal, ilk tıbbi kullanım onayı 1999 yılında Avusturalya'da almıştır. 80'den fazla farklı tür mikroorganizmaya karşı etkilidir. Balların bakterisidal etkinliğinin yanında, quorum sensing inhibisyonu, biyofilm oluşumunu engelleme, oluşmuş biyofilmli parçalama gibi özellikleri de vardır (94). Ballar antimikrobiyal aktivitesini yüksek ozmolaritesi (Aw: 0.6) ve asiditesi (pH:3.4-6.1) ile çoğu mikroorganizmalar için canlı kalamayacağı bir ortam oluşturarak sağlar(95,96,97).

Diğer : Bakteriyofaj ve nanopartikül uygulamaları da antibiyofilm tedavi stratejileri için ümit vericidir (98,99).

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