ける、免疫原性を向上させ、肺炎球菌ワクチン接種の防御効果を高めることである。多数の莢膜多糖体に対する免疫反応は、多糖体抗原がキャリア蛋白と共有結合することによって改善される(116,117)。今日の結合型ワクチン開発は、小児に感染症を最も高頻度で惹起する血清型に集中して行われている。開発および評価段階にあるワクチン製剤候補には、1種類以上のキャリア蛋白と結合する肺炎球菌多糖体の少なくとも7種類の血清型がカバーされている。7種類の最も一般的な血清型[4,6B,9V,14,18C,19F,23Fおよび血清学的交差反応性の血清型（例：6A）]に対して防御作用を発揮する有効な結合型ワクチンは、米国の6歳未満の小児に発生する菌血症の86%、髄膜炎の83%、中耳炎の65%を予防することが可能であると思われる(45)。6歳以上では、これらの血清型が脳脊髄液および血液からの分離株の50%を占めている(44)。第I相試験および第II相試験の中間結果では、これらのワクチンは概ね安全であり、2～5歳の幼児および生後2ヵ月の乳児において、一次抗体反応と既往抗体反応を惹起することが示唆されている(118-121)。小児における急性肺炎球菌性中耳炎と肺炎球菌による侵襲性疾患に対する結合型ワクチンの有効性を評価するための多施設共同試験が進行中である。

多糖体ワクチンには、小児の鼻咽頭における *S. pneumoniae* の保菌に対する抑制作用はない (122)。しかしながら、予備データによれば、結合型ワクチンの場合、ワクチンがカバーしている肺炎球菌血清型については、鼻咽頭保菌を抑制する可能性が示唆されている(123)。*S. pneumoniae* の保菌率を抑制することは、伝染を抑制して疾患発生率を低下させることにより、ワクチンの全体的な作用を強化する可能性がある。前向き無作為化試験を実施し、侵襲性肺炎球菌性感染症に対する結合型ワクチンの防御効果を証明する必要がある。これらのワクチンについては、現行の23価多糖体ワクチンが無効である成人の免疫不全患者において、肺炎球菌性疾患を予防する上で有用であるかどうかについても評価する必要がある。

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Vol. 46 / No. RR-8 MMWR 19

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