

Epidemiology and composition of Randall's plaque

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Randall's plaques are found in a large number of calcium oxalate stone formers today. From an epidemiological point of view, we observed a constant increase in the proportion of calcium oxalate stones developed from a Randall's plaque in France over the past forty years. Stones developed on a Randall's plaque typically present a small depressed zone (named umbilication) corresponding to the tip of the papilla and containing some material detached from the plaque. Thus, by examining the morphology of the stone, we can determine the part of urinary calculi initiated from a Randall's plaque.

The proportion of Randall plaque-related stones was assessed over 3 time periods: 1989–1991, 1999–2001, and 2009–2011. Because modern techniques used to remove urinary calculi from the urinary tract often use laser or ultrasounds or shock waves, Randall's plaque is often lost during the treatment. However, around 50% of all stones are spontaneously passed and 10-15% of stones are removed from the urinary tract without fragmentation. So, we examined the morphology of 30,149 non fragmented calcium oxalate stones and we found that 10,282 harbored Randall plaque residues (34.1%). The prevalence of Randall plaque-related stones increased dramatically during the past years. In young women, 17% of calcium oxalate stones were associated with Randall plaque during the 1989–1991 period, but the proportion rose to 59% 20 years later ($P < 0.001$). Patients with plaques experienced their first stone-related event earlier in life as compared with those without plaque (median age 26 vs 34 years, $P = 0.02$). Randall's plaque was made of carbapatite in 90.8% of cases, amorphous carbonated calcium phosphate in 4.6%, sodium hydrogen urate in 3.5%, and various other components in 1% of cases. Of note, whewellite was the main or unique component around the plaque in 97.4% of cases while weddellite was the main component in less than 1% of cases.