

Clinical implications of serum CA19-9 level in nontuberculous mycobacterial pulmonary disease

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Background/Aims: Serum carbohydrate antigen(CA) 19-9 is widely used as a tumor marker for gastrointestinal cancers. Studies have suggested an association between elevated CA19-9 level and severity of nontuberculous mycobacterial-pulmonary disease (NTM-PD), however, the clinical implication of CA 19-9 in NTM-PD patients is unclear. In this study, we compared the clinical characteristics of patients who had elevated (37 > U/mL) and normal levels of CA19-9, and evaluated the relationship between CA19-9 and treatment response of NTM-PD.

Methods: We retrospectively screened NTM-PD patients who had available serum CA19-9 data before or after one year of diagnosis of NTM-PD between January 1994 to December 2020 at Samsung Medical Center, South Korea. A total of 1,112 NTM-PD patients with CA19-9 data was identified and included in the study. We compared clinical characteristics and treatment outcomes, including culture conversion rate or microbiological culture rate, between NTM-PD patients who had elevated CA19-9 (elevated group) and normal CA19-9 (normal group) levels.

Results: Of 1,112 study patients, 322 (29%) had elevated CA19-9 level and 790 (71%) had normal level of CA19-9. The values of erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) were significantly higher in the elevated group ($p < 0.001$, $p = 0.029$, respectively), and ESR level had weak positive correlation with CA19-9 level (spearman correlation $\rho = 0.139$, $p < 0.001$). Among the patients who started antibiotic treatment, culture conversion within one year after starting antibiotics did not show a significant difference between the two groups (80% [164/206] in elevated group vs. 72% [273/377] in normal group, $p = 0.055$). Microbiological cure at the end of treatment tended to be higher in the elevated group than in the normal group (89% [175/197] vs. 82% [291/354], $p = 0.039$). However, no significant association between serum CA19-9 level (continuous variable) and microbiological cure was identified in a multivariate model after adjusting for other clinical variables.

Conclusions: Serum CA19-9 level correlated with inflammatory markers, such as ESR, CRP. However, CA19-9 level did not show a significant association with treatment response of NTM-PD.

Figure 1. Cumulative culture conversion rate according to CA19-9 level (Kaplan-Meier, log-rank test, $n = 551$, $p = 0.147$)

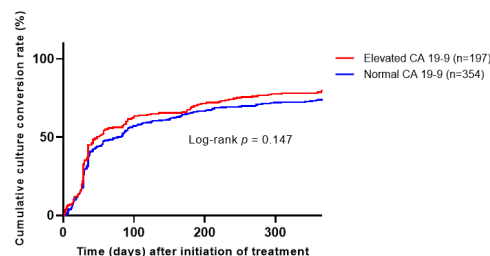


Table 1. Baseline characteristics of study patients

Characteristics	Total (n = 1,112)	Elevated CA 19-9 (n = 322)	Normal CA 19-9 (n = 790)	p-value
Sex, female	677 (61)	228 (71)	449 (57)	<0.001
Age, year	60 (52–68)	60 (53–70)	60 (52–67)	0.190
Body mass index, kg/m ²	20.7 (19.2–22.5)	20.3 (18.8–21.9)	20.9 (19.3–22.9)	0.001
Smoking status				0.001
Never	799 (72)	256 (80)	543 (69)	
Ex	283 (25)	62 (19)	221 (28)	
Current	30 (3)	4 (1)	26 (3)	
Radiological form				<0.001
Nodular bronchiectatic form	902 (81)	297 (92)	605 (77)	
Fibrocavitary form	154 (14)	20 (6)	134 (17)	
Non-classifiable form	56 (5)	5 (2)	51 (7)	
Cavity	259 (23)	64 (20)	195 (25)	0.085
Etiology				
<i>M. avium</i> complex	797 (72)	209 (65)	588 (74)	0.001
<i>M. massiliense</i>	109 (10)	37 (12)	72 (9)	0.227
<i>M. abscessus</i>	103 (9)	45 (14)	58 (7)	0.001
Mixed	59 (5)	21 (7)	38 (5)	0.248
Others	44 (4)	10 (3)	34 (4)	0.353
Laboratory test				
ESR, mm/h (n = 811)	27 (15–47)	31 (18–54)	26 (14–45)	<0.001
CRP, mg/dL (n = 906)	0.13 (0.05–0.68)	0.16 (0.06–0.68)	0.12 (0.05–0.70)	0.029

Data are presented as number (%) or median (interquartile range). *p for trend = 0.561. AFB = acid fast bacilli, ESR = erythrocyte sedimentation rate, CRP = C-reactive protein, BACES = Body mass index, Age, Cavity, ESR, and Sex (each one point).

Table 2. Treatment outcomes of patients who received antibiotic treatment (n = 688)

Variables	Total (n = 688)	Elevated CA 19-9 (n = 239)	Normal CA 19-9 (n = 449)	p-value
Treatment duration, month (n = 646)	19.4 (15.2–24.5)	19.0 (15.2–24.5)	19.6 (15.2–24.6)	0.949
Culture conversion, within one year	437/583 (75)	164/206 (80)	273/377 (72)	0.055
Microbiological cure	466/551 (85)	175/197 (89)	291/354 (82)	0.039
Time-to-culture conversion, month (n = 466)	1.2 (0.9–5.0)	1.4 (0.9–5.8)	1.2 (0.9–4.5)	0.338

Data are presented as number (%) or median (interquartile range).