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신질환 발현양상에 따른 M단백 검사의 진단적 가치

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Diagnostic Performance of M-protein Assays to Detect Clinically Significant Plasma Cell Dyscrasia according to Clinical Presentation of Kidney Disease

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Background: Since plasma cell dyscrasia (PCD) is one of frequently encountered malignancies in patients presenting with kidney disease, screening for monoclonal gammopathy (MG) is critical in adult patients. This study examined the diagnostic performance of monoclonal(M)-protein assays to detect clinically significant PCD, especially according to clinical presentation of kidney disease.
Methods: We identified 944 patients who underwent kidney biopsy and at least one M-protein tests for the analysis. Patients were divided into 4 groups by initial clinical syndrome: Nephrotic syndrome (NS), chronic glomerulonephritis (CGN), asymptomatic urinary abnormalities (AUA), acute kidney injury (AKI). We evaluated sensitivity and specificity of M-protein assays [serum and urine electrophoresis (EP), serum and urine immunofixation electrophoresis (IF), serum free light chain (FLC) ratio] to detect clinically significant PCD - multiple myeloma (MM) or MG renal significance (MGRS). Screening panels with the highest sensitivity were also identified.
Result: Overall, 304 (32%), 331 (35%), 249 (26%), and 60 (6%) patients corresponded to NS, CGN, AUA and AKI, respectively and 81(9%) patients had clinically significant PCD. Both of MM and MGRS were most frequent in NS group (MM: 6%, 5%, 1%, and 2% in NS, CGN, AUA and AKI, respectively, MGRS: 6%, 1%, 2%, and 0% in NS, CGN, AUA and AKI, respectively). The sensitivity of serum EP, urine EP, and serum FLC ratio were 65%, 68%, and 69%, lower than those of serum IF and urine IF in detection of MM or MGRS (serum: 79%, urine: 87%). When viewing the diagnostic performance of M-protein assays by clinical group, NS group showed the lowest sensitivity in all five M-protein assays compared with other groups. To find out optimal screening panels to detect PCD, sensitivity of several combinations of 5 assays were examined by clinical presentation. In NS group, combinations of serum IF, urine IF, and serum FLC ratio showed the highest sensitivity to detect MM (100%) and MGRS (94%, Table 1). In other groups, combination of serum and urine EP detected all the cases of MM, and serum plus urine IF or serum IF plus serum FLC ratio detected all the cases of MGRS.
Conclusion: The sensitivity of M-protein assays varied by initial clinical presentation of kidney disease. Patients with NS had lower sensitivity in M-protein assays comparing those with other clinical syndromes. This study suggests that we need to consider clinical presentation of kidney disease when choosing M-protein assays as screening panels of PCD.

Key Words: 단클론성 감마글로불린병증, 선별검사, 신증후군
Monoclonal gammopathy, Screening panel, Nephrotic syndrome

Table 1. Sensitivity of Screening Panel to Detect MM and MGRS by Clinical Syndrome

		Serum PEP Urine PEP	Serum IF+ Urine IF	Serum PEP Urine PEP Serum IF+ Urine IF	Serum IF+ Urine IF+ Serum FLC	Serum PEP Urine PEP Serum IF+ Urine IF+ Serum FLC	Serum IF+ Serum FLC
MM	NS (n=17)	88%	88%	94%	100%	100%	94%
	CGN (n=16)	100%	100%	100%	100%	100%	100%
	AGN (n=1)	100%	100%	100%	100%	100%	100%
	AUA (n=2)	100%	100%	100%	100%	100%	100%
MGRS	NS (n=18)	50%	82%	82%	94%	94%	88%
	CGN (n=4)	67%	100%	100%	100%	100%	100%
	AUA (n=5)	80%	100%	100%	100%	100%	100%