Assessment of avidity index in blood donors samples with indeterminate anti-HCV reactivity

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Abstract

Objective:
The interpretation of samples with indeterminate anti-HCV reactivity remains one of the main problems of HCV diagnostics. The aim of our study was to assess Avidity Index (AI) in blood donor samples with isolated anti-HCV reactivity.

Materials and methods:
169 samples were initially selected from 636 anti-HCV positive specimens due to isolated reactivity with core, NS3, NS4 or NS5 proteins of virus hepatitis C only. All samples were divided conditionally into two groups according to the S/CO value: S/CO>6 and S/CO<6. The AI was assessed for samples of both groups.

Results:
All samples with an isolated activity to the core, NS3 and NS4 were distributed almost equally: 57, 49 and 61 samples accordingly. There were only two samples with isolated anti-HCV NS5 reactivity. 167 (98.8 %) out of 169 samples with isolated reactivity were assessed as samples with Low AI. 100% (110) of the samples with S/CO<6 and 96.6% (57) with S/CO>6 were Low AI-samples. There were only two samples with S/CO > 6 and High AI among specimens with indeterminate anti-HCV reactivity.

Conclusion:
Low avidity index might indicate on early infection. The indeterminate anti-HCV samples with high AI may indicate on remnants of humoral immune response after a resolved HCV infection. The assessment of avidity index might be one of the methods for supplemental testing of samples with isolated anti-HCV reactivities. Further studies are needed to clarify of indeterminate anti-HCV reactivity status for counseling blood donors and patients.

Objective

The interpretation of samples with indeterminate anti-HCV reactivity remains one of the main problems of HCV diagnostics. Blood donors with isolated hepatitis C virus antibody (anti-HCV) activity are rejected from blood donation. Disclosure of the characteristics of the indeterminate serological pattern could optimize the test procedure and contribute to care of blood donors. The aim of our study was to assess Avidity Index (AI) in blood donor samples with isolated anti-HCV reactivity.

Materials and methods

This study was performed using 636 anti-HCV antibodies containing plasma specimens. Anti-IgG profile was determined for all samples. 8 recombinant HCV antigens (core, NS4, NS5 and 5 NS3 with different genotypes) were used for coating of microtiter plates separately, except for NS3 recombinant proteins – they were adsorbed as a mixture. The detection of antibody avidity was based on an indirect ELISA method using a mixture of the previously mentioned recombinant antigens. During the assay performance each sample was tested with physiological saline (0.85% NaCl) and denaturing solution (8 M urea). Avidity index (AI) was determined as a ratio of the optical density (OD) value obtained following urea treatment divided by the OD obtained without urea treatment, expressed as a percentage.

Results

169 specimens with isolated anti-HCV reactivity were determined (Fig. 1). All samples were divided conditionally into two groups according to the S/CO value: S/CO>6.0 and S/CO<6.0. The AI was assessed for samples of both groups (Table 1).

Anti-IgG profile for specimens with isolated anti-HCV reactivity

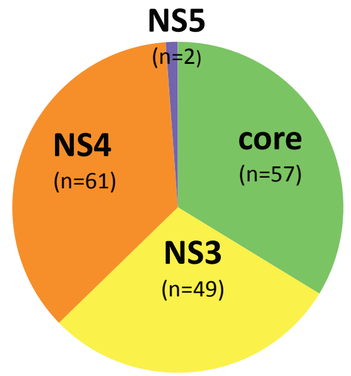

Fig.1

The Avidity Index for specimens with isolated anti-HCV reactivity (summary data)

Table 1

	Samples quantity (n=) with AI	
	Low AI	High AI
S/CO > 6.0	57	2
	59	
S/CO < 6.0	110	0
	110	

All samples with an isolated activity to the core, NS3 and NS4 were distributed almost equally, except for anti-HCV NS5 reactivity. 167 (98.8 %) out of 169 samples with the isolated reactivity were assessed as samples with Low AI. Average AI value was 4% (95% CI: 3.3% to 5.0%) for Low AI group. 100% (110) of the samples with S/CO<6.0 and 96.6% (57) of the samples with S/CO>6.0 were Low AI-samples. There were only two samples with S/CO>6.0 and High AI among specimens with indeterminate anti-HCV reactivity, and they belonged to the core group.

Data analysis according to the S/CO value, AI and isolated anti-HCV reactivity is represented in Table 2.

The Avidity Index for specimens with isolated anti-HCV reactivity (into groups: core, NS3, NS4, NS5)

Table 2

	core		NS3		NS4		NS5	
	Samples quantity (n=) with AI							
	Low AI	High AI	Low AI	High AI	Low AI	High AI	Low AI	High AI
S/CO > 6.0	23	2	16	0	18	0	0	0
	25		16		18		0	
S/CO < 6.0	32	0	33	0	43	0	2	0
	32		33		43		2	

Conclusion

The indeterminate anti-HCV samples with high AI may indicate the remnants of humoral immune response after a resolved HCV infection. Low avidity index might be an evidence of early infection as well as nonspecific antibody reactions. HCV RNA testing remains necessary to clarify of specimens status with the inderteminant anti-HCV reactivity. The assessment of avidity index might be one of the methods for supplemental testing of samples with isolated anti-HCV reactivities. Further studies are needed to clarify indeterminate anti-HCV reactivity status for counseling blood donors and patients.

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