




Utility of serological screening for measles, mumps and rubella in immunocompromised patients

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ABSTRACT

Marchi et al. in their article (Measles in pregnancy: a threat for Italian women? Hum Vaccin Immunother. 2019 Jun 20:1–3) observed that 96.9% of pregnant women were positive for anti-measles IgG (with a higher risk of contracting measles in those aged 19–29 years) emphasizing the importance of serological screening before pregnancy. We evaluated seroprotection/seropositivity rates to Measles, Mumps and Rubella in 324 adults with an acquired immune-deficiency needing an immunization program. We found that younger patients (20–29 years) had a seroprevalence below 85%. Overall, a relevant proportion (21.6%, 54/250) of patients was susceptible to at least one infection needing immunization. Our results confirm the usefulness of proper strategies for identifying individuals susceptible to vaccine-preventable infections and protecting them through vaccination.

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Sir,

We read with great interest the article of Marchi et al.¹ In this study, authors assessed the immunity against measles in pregnant women from Apulia Region (Southern Italy). They observed that 96.9% of pregnant women were positive for anti-measles IgG and those aged 19–29 years showed to be at higher risk of contracting measles as their seroprevalence was <90%. The authors assumed that low immunization coverage was related to the fact that younger women were born before the introduction of the second dose of combined measles, mumps and rubella (MMR) vaccine in Italy.² Although the establishment of the National Plan for Measles and Congenital Rubella Elimination (NPMCRE) in 2003,² the goal of elimination has not been reached yet and the virus circulates widely in the population.^{1,3} In this context, Marchi and colleagues highlight the importance of serological screening and recommend testing before pregnancy, especially in younger women, along with a catch-up vaccination campaign.¹

In Italy, the National Immunization Plan 2017–2019 recommends MMR vaccination in children and in subjects at high-risk for medical condition: patients with an acquired immune deficiency (e.g. HIV-infection, asplenia, complement deficiencies), diabetes, chronic lung diseases, alcoholism, chronic liver and renal diseases, subjects receiving concentrated coagulation factors and for household members of patients affected by the pathologies listed above.⁴ Immunocompromised hosts are at higher risk of severe measles and case fatality rates of around 70% and 40% in patients with cancer and in HIV-infected subjects were observed.^{5,6}

We evaluated seroprotection/seropositivity rates to MMR in adults with an acquired immune deficiency needing a tailor-made immunization program and followed up at the specialist vaccination clinic at San Martino Hospital

(Liguria Region, Northern Italy). A total of 324 patients were included in this study. One hundred forty-two (43.8%) of them were solid organ transplant candidates/recipients, 153 (41.7%) under treatment with/candidate to receive immunosuppressive therapy, 47 (14.5%) were asplenic (Table 1). Mean age was 54.4 ± 12.3 , 53.7% of the patients were male. Serum samples obtained during routine check-ups were tested for IgG antibodies against measles, mumps and rubella, using the commercial ELISA IgG DiaSorin assay. Tests were performed and qualitatively classified following manufacturer's instruction. Seroprotection rates stratified by age are reported in Table 2. Measles serology was available from 287 patients, 267 (93.03%) tested positive and 7 (2.44%) weakly positive. Although our study population is different from the one described by Marchi et al., ours and their results are concordant. In this study, we found that younger patients aged 20–29 years had

Table 1. Study population according to medical condition.

	N (%)
Solid organ transplantation:	142 (43.8)
• Liver transplantation	85 (26.2)
• Kidney transplantation	48 (14.8)
• Liver and kidney transplantation	5 (1.5)
• Others	4 (1.2)
Patients under treatment with/candidate to receive immunosuppressive therapy:	135 (41.7)
• Neurological disease (e.g. multiple sclerosis)	52 (16.0)
• Hematological disease (e.g. lymphoma)	12 (3.7)
• Inflammatory bowel diseases	16 (4.9)
• Vasculitis	4 (1.2)
• Rheumatic disease (e.g. rheumatoid arthritis, systemic lupus erythematosus)	39 (12.0)
• Others	12 (3.7)
Asplenia	47 (14.5)
Total	324 (100)

Table 2. Seroprotection/seropositivity rates by age groups.

Age (Years)	MEASLES				MUMPS				RUBELLA				IgG negative to at least one of these infections			
	IgG positive		IgG weakly positive*		IgG positive		IgG weakly positive*		IgG positive		IgG weakly positive*					
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)				
20-29	10	76.92 (54.01-99.82)	1	7.69 (-6.79-22.17)	13	50.00 (21.71-78.29)	2	16.67 (-4.41-37.75)	12	84.62 (65.01-104)	0	0 (0-0)	13	36.36% (4/11)	15.42 (1.16-786.68)	0.0169
30-39	25	92.59 (82.71-102.47)	0	0 (0-0)	27	69.23 (51.49-86.97)	2	7.69 (-2.55-17.93)	26	82.76 (69.01-96.51)	0	0 (0-0)	29	46.15% (12/26)	23.14 (2.74-1024.65)	0.0003
40-49	39	86.67 (76.74-96.60)	3	6.67 (-0.62-13.95)	45	64.29 (49.80-78.78)	7	16.67 (5.40-27.94)	42	92 (84.48-99.52)	1	2.00 (-1.88-5.88)	50	31.71% (13/41)	12.54 (1.62-551.95)	0.0034
50-59	88	95.65 (91.48-99.82)	0	0 (0-0)	92	83.54 (75.36-91.71)	3	3.80 (-0.41-8.02)	79	96.84 (93.32-100.36)	0	0 (0-0)	95	18.67% (14/75)	6.20 (0.84-271.51)	0.0440
60-69	75	93.75 (88.44-99.05)	3	3.75 (-0.41-7.91)	80	76.71 (67.01-86.40)	10	13.70 (5.81-21.59)	73	96.63 (92.88-100.38)	0	0 (0-0)	89	14.49% (10/69)	4.57 (0.589-205.80)	0.1141
>70	30	100 (100-100)	0	0 (-)	30	89.66 (78.58-100.74)	3	10.34 (-0.74-21.42)	29	96.55 (89.91-103.19)	0	0 (0-0)	29	3.57% (1/28)		
Tot	267	93.03 (90.08-95.97)	7	2.44 (0.65-4.22)	287	76.25 (71.08-81.41)	27	10.34 (6.64-14.03)	261	94.10 (91.46-96.74)	1	0.33 (-0.31-0.97)	305	21.60% (54/250)	7.43 (1.16-310.05)	0.0129

* Cutoff index: >1, ≤1.2

**Tot = Subjects with a completed serological test for MMR or subjects with IgG negative for one of these at least.

***Odds Ratio of susceptibility to at least one of these infections vs >70 years old age group.

a seroprevalence below 85%. Concerning rubella, from the 305 tested subjects, 287 (94.1%) were IgG positive and 1 (0.33%) weakly positive. Interestingly, in patients aged 20-40 years positivity rate was <85%. This is crucial especially for a susceptible woman of childbearing age. Overall, much lower rates of seropositivity were showed for mumps than for measles and rubella: of the 261 patients who had undergone to serological screening, 199 (76.25%) resulted positive and 27 (10.34%) weakly positive (Table 2). This phenomenon has already been observed in adults with HIV infection.⁷

To conclude, it is noteworthy that a relevant proportion (21.6%, 54/250) of patients susceptible to at least one infection was observed. Subjects not tested for one at least and positive for the others were 74 of 324. Susceptibility to at least one infection was associated to age (30-39 years OR 23.14, CI 2.74-1024.65; 40-49 years OR 12.54, CI 1.62-551.9) (Table 2). These results confirm the usefulness of serological testing for identifying individuals susceptible to common vaccine-preventable infections and protecting them through vaccination. In order to guarantee maximum protection of patients at high-risk, screening at the first outpatient access is essential for appropriate counseling. Timeliness is crucial especially in those who must be placed on the active waiting list for transplantation or start long-term immunosuppressive therapy.

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