

Awareness and knowledge of human papillomavirus-related diseases are still dramatically insufficient in the era of high-coverage vaccination programs

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Abstract

Purpose Assess knowledge and awareness concerning human papillomavirus (HPV) infection, HPV-associated diseases, and the existence of a specific vaccine among non-HPV-screened Caucasian-European adults after the market introduction of HPV vaccines.

Methods A cohort of 934 consecutive patients seeking their first medical help for uroandrogenic purposes anonymously completed a 17-item questionnaire related to HPV. Data were compared with those of an age-comparable cohort of nurses (controls; $n = 172$).

Results Knowledge and awareness of HPV infection were reported in 564 (51 %) and 735 (66.5 %) participants, respectively. Overall, 51.3 % participants were informed that HPV is sexually transmitted, but most reported not

being aware that HPV infection can be associated with anogenital warts (61.7 %), female genitalia (46.6 %), penile (58.5 %), and oropharyngeal cancer (79.7 %). Only 36.5 % of the participants were informed regarding the existence of a specific vaccine. HPV knowledge was retrieved through the media and/or the Internet, at school, doctors, and relatives or friends in 395 (35.7 %), 155 (14 %), 97 (8.8 %), and 88 (8.0 %) participants, respectively. Multivariable analyses showed that female gender [odds ratio (OR) 3.08; $p < 0.001$; 95 % confidence interval 2.18–4.35] and educational status [high school diploma versus primary–secondary (OR 1.61; $p = 0.03$; 1.04–2.51); university degree versus primary–secondary (OR 2.89; $p < 0.001$; 1.83–4.57)] were significantly associated with awareness of HPV.

Conclusions Only approximately half of the participants reported knowing what HPV infection is, even after the approval and market introduction of the HPV vaccine. Awareness about the existence and availability of a HPV vaccine was even lower.

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Introduction

Infection with human papillomavirus (HPV) is highly prevalent in both genders; overall, HPV prevalence among a large population of women was estimated to be 10.4 % [1]; similarly, the incidence of a new genital HPV infection was reported to be 38.4 per 1,000 person months in a large male population aged 18–70 years [2]. Anogenital HPV is the most common sexually transmitted infection (STI) worldwide [1, 2], with a 10 % lifetime risk of HPV-related

genital warts in industrialised countries [1, 3]. A specific association with HPV DNA has been reported for several different anogenital cancers [4–6] and also for oropharyngeal cancers [7, 8]. HPV infection has also been demonstrated in sperm [9, 10] with potential implications for male infertility and an increased risk of pregnancy loss in couples undergoing in vitro fertilisation programs [10].

The planning of prevention interventions against HPV infection has progressed rapidly. Prophylactic HPV vaccines have been developed and demonstrated to be efficacious in both genders [11, 12]. In this context, understanding factors associated with HPV acquisition becomes crucial in the development of comprehensive preventive programs to control HPV infection and consequent plans for vaccination strategies. However, despite the advertising campaigns about vaccination and easily accessible knowledge via the Internet, public awareness about HPV, the modalities of HPV acquisition, and HPV-related diseases is still dramatically lacking [13–18].

These observations prompted us to assess (1) knowledge and awareness concerning HPV infection and potential HPV-associated diseases, (2) modalities and predictors of awareness about HPV infection, and (3) awareness about the existence of a vaccine for HPV in a large cohort of non-HPV-screened Caucasian-European adults at a sexual and reproductive medicine centre seeking their first medical help after the approval and market introduction of the HPV vaccine.

Methods

The analyses were based on a cohort of 1,106 Italian Caucasian-European individuals (“participants”) who completed anonymously a structured questionnaire aimed at evaluating knowledge and awareness of the risks and prevention aspects related to HPV infection. Participants were recruited if they were 18 years of age or older and had attended an academic sexual and reproductive medicine centre seeking their first medical help (patients; $n = 934$). Data were compared with those of an age-comparable cohort of nurses (controls; $n = 172$) consecutively recruited in the same academic hospital.

Participants were invited to complete anonymously a 17-item self-administered questionnaire with closed questions (Online Resource 1). As a prerequisite for entry, all participants were asked whether they either regularly or at least occasionally surf the Internet. In this context, terms and definitions which were used throughout the study have been taken from the Internet, mainly considering blogs and forums for patients in order to consider terminology, which could be readable and understandable for people who were not specifically in the medical field.

Sociodemographic and sexual behavioural characteristics of participants are presented as means (medians; ranges). The statistical significance of differences in means and proportions was tested with the two-tailed *t* test and the Pearson chi-square test, respectively. Logistic regression models tested predictors associated with HPV awareness, and odds ratios (95 % CI) were estimated. Statistical tests were performed using SPSS v.19 (IBM Corp., Armonk, NY, USA). All tests were two sided, with a significance level set at 0.05.

Results

Study recruitment began in September 2011 and ended in November 2012. Of the 1,106 participants, 1,051 (95.0 %) did regularly consult the Internet; the remainder reported at least occasional use.

Table 1 lists the characteristics and the descriptive statistics of the entire cohort of participants; likewise, Table 1 also depicts HPV knowledge according to a segregation of patients versus controls. Overall, only 51 % of the participants reported they knew what HPV infection is; 66.5 % were at least aware of HPV infection. Of the participants, 51.3 % were aware that HPV is sexually transmitted, but most reported not being aware that HPV infection could be associated with anogenital warts, female genitalia cancer, penile cancer, and oropharyngeal cancer. Overall, 36.5 % of the participants knew about the existence of a vaccine for HPV infection. Most participants had HPV knowledge through the media and/or the Internet, followed by the information gathered at school or through doctors, relatives, or friends.

Table 2 details HPV knowledge according to gender. A significantly higher rate of women compared with men reported to know or to be at least aware of HPV infection, as well as the fact that HPV is sexually transmitted and can be associated with anogenital warts, female genitalia, penile cancer, and oropharyngeal cancer (all $p \leq 0.003$). More women were informed of the existence of a vaccine for HPV infection than men.

Of 564 participants aware of HPV infection, most had gained awareness through the media and/or the Internet [274 (48.6 %)], were informed that HPV is sexually transmitted [468 (83.0 %)], and knew that HPV infection can be associated with both genital warts [266 (47.2 %)] and female genitalia cancer [457 (81.0 %)]. Most of them were aware of the existence of a vaccine for HPV infection [364 (64.5 %)]. Conversely, most participants reported that HPV infection was not potentially associated with penile cancer [239 (42.4 %)] and did not know whether HPV infection might be associated with the risk of oropharyngeal cancer [365 (64.7 %)]. Moreover, a significantly higher

Table 1 Participants' segregation according to patients versus controls grouping ($N = 1,106$)

Group	Participants	Patients	Controls	<i>p</i> value*
No. (%)	1,106	934 (84.4)	172 (15.6)	
Age (years)				
Mean (SD)	40.0 (12.2)	40.3 (12.2)	38.3 (12.5)	0.06
Range	18.0–83.0	18.0–83.0	20.0–66.0	
Age at first sexual intercourse				
Mean (SD)	18.9 (3.9)	19.0 (4.1)	18.5 (3.4)	0.08
Gender				
Female	325 (29.4)	214 (22.9)	111 (64.5)	0.001 (χ^2 , 121.271)
Male	781 (70.6)	720 (77.1)	61 (35.5)	
Sexual orientation				
Heterosexual	1,079 (97.6)	911 (97.5)	168 (97.7)	0.9 (χ^2 , 0.01)
Homosexual/bisexual	27 (2.4)	23 (2.5)	4 (2.3)	
Educational status				
Secondary school degree or less	150 (13.6)	127 (13.6)	23 (13.4)	0.001 (χ^2 , 14.35)
High school degree	489 (44.2)	434 (46.5)	55 (32.0)	
University degree or postgraduate	467 (42.2)	373 (39.9)	94 (54.7)	
Relationship status				
Stable relationship	961 (86.9)	810 (86.7)	151 (87.8)	0.70 (χ^2 , 0.15)
Unstable relationship/single	145 (13.1)	124 (13.3)	24 (12.2)	
Primary reason for office evaluation				
Couple infertility	521 (47.1)			
Sexual dysfunction	218 (19.7)			
Benign urologic disorders	163 (14.7)			
Urologic cancers	32 (2.9)			
Case controls	172 (15.6)			
Sexual behaviours protective of STI transmission				
Yes	392 (35.4)	306 (32.8)	86 (50.0)	<0.001 (χ^2 , 18.86)
No	714 (64.6)	628 (67.2)	86 (50.0)	
HPV knowledge				
Yes	564 (51.0)	419 (44.9)	145 (84.3)	<0.001 (χ^2 , 90.42)
No	542 (49.0)	515 (55.1)	27 (15.7)	
Combined HPV awareness				
Yes	735 (66.5)	577 (61.8)	158 (91.9)	<0.001 (χ^2 , 58.97)
No	371 (33.5)	357 (38.2)	14 (8.1)	
Mode of knowledge about HPV				
Media/Internet	395 (35.7)	345 (36.9)	50 (29.1)	<0.001 (χ^2 , 182.17)
Relatives/friends	88 (8.0)	81 (8.7)	7 (4.1)	
Clinicians	97 (8.8)	71 (7.6)	26 (15.1)	
School	155 (14.0)	80 (8.6)	75 (43.6)	
Don't know	371 (33.5)	357 (38.2)	14 (8.1)	
HPV sexual transmissibility knowledge				
Yes	567 (51.3)	427 (45.7)	140 (81.4)	<0.001 (χ^2 , 77.09)

Table 1 continued

	Group	Participants	Patients	Controls	<i>p</i> value*
	No	80 (7.2)	70 (7.5)	10 (5.8)	
	Don't know	459 (41.5)	437 (46.8)	22 (12.8)	
	HPV-related genital warts knowledge				
	Yes	287 (25.9)	178 (19.1)	109 (63.4)	<0.001 (χ^2 , 153.22)
	No	137 (12.4)	118 (12.6)	19 (11.0)	
	Don't know	682 (61.7)	638 (68.3)	44 (25.6)	
	HPV-related female genitalia cancer knowledge				
	Yes	514 (46.5)	375 (40.1)	139 (80.8)	<0.001 (χ^2 , 98.12)
	No	77 (7.0)	69 (5.5)	8 (4.7)	
	Don't know	515 (46.6)	490 (52.5)	25 (14.5)	
	HPV-related male penile cancer knowledge				
	Yes	145 (13.1)	71 (7.6)	74 (43.0)	<0.001 (χ^2 , 174.36)
	No	314 (28.4)	262 (28.1)	52 (30.2)	
	Don't know	647 (58.5)	601 (64.3)	46 (26.7)	
	HPV-related head and neck cancer knowledge				
	Yes	106 (9.6)	68 (7.3)	38 (22.1)	0.003 (χ^2 , 37.91)
	No	119 (10.8)	107 (11.5)	12 (7.0)	
	Don't know	881 (79.7)	759 (81.3)	122 (70.9)	
	HPV vaccine knowledge				
	Yes	404 (36.5)	274 (29.3)	130 (75.6)	<0.001 (χ^2 , 136.44)
	No	97 (8.8)	86 (9.2)	11 (6.4)	
	Don't know	605 (54.7)	574 (61.5)	31 (18.0)	

Data are no. (%)

SD standard deviation (for continuous variables), *STI* sexually transmitted infections, *HPV* human papillomavirus

* *p* value according to two-tailed Student *t* test, Mann–Whitney *U* test or chi-square test, as indicated

proportion of women than men did know that HPV infection can be associated with anogenital warts [131 (55.0 %) vs. 135 (41.4 %), respectively; $p < 0.001$ (χ^2 , 15.27)] and female genitalia cancer [213 (89.5 %) vs. 244 (74.8 %), respectively; $p < 0.001$ (χ^2 , 20.40)], and they also knew about a vaccine for HPV [181 (76.1 %) vs. 183 (56.1 %), respectively; $p < 0.001$ (χ^2 , 24.01)]. Genders did not differ in terms of knowledge concerning HPV sexual transmissibility, HPV-related penile cancer, and oropharyngeal cancer.

According to univariable analysis (Table 3), female gender, university degree or higher, and having a stable relationship were significantly associated with HPV awareness. Controls were shown to be notably more aware of HPV infection compared with patients of any of the subgroups considered. Multivariable analyses confirmed that female gender, high school diploma or higher, having a stable relationship status, and belonging to the subcohort of health professionals were highly associated with HPV awareness. Conversely, no significant associations were found between HPV awareness and the other possible predictors.

Discussion

Our findings show that only 51 % of participants in a large cohort of non-HPV-screened Caucasian-European individuals reported they knew what HPV infection is; 66.5 % were at least aware of HPV infection. Current study was fuelled by previous data that had demonstrated low levels of awareness and knowledge of STIs as a whole [19, 20], especially of HPV [13–16, 18, 21], although we are in the era of the Internet and of several national vaccination programs [22].

The literature correctly subdivides rates of knowledge and awareness as a function of the watershed represented by the approval and marketing introduction of the HPV vaccine. In this context, Klug et al. [13] reported the results of a systematic review including 39 studies published between 1992 and 2006 with a total of 19,986 participants; the proportion of individuals who had heard of HPV ranged from 13 to 93 %, and the authors concluded that knowledge of the general public about HPV infection was poor. More recently, Samkange-Zeeb et al. [19] reported the results of a systematic review using HPV studies published

Table 2 Participants' segregation according to gender grouping ($n = 1,106$)

Gender	Female	Male	p value*
No. (%)	325 (29.4)	781 (70.6)	
Age (years)			
Mean (SD)	36.3 (9.6)	41.5 (12.9)	<0.001
Age at first sexual intercourse			
Mean (SD)	19.2 (3.7)	18.8 (4.2)	0.52
Sexual orientation			
Heterosexual	324 (99.7)	755 (70.0)	0.003 (χ^2 , 8.80)
Homosexual/bisexual	1 (0.3)	26 (3.3)	
Educational status			
Secondary school degree or less	36 (11.1)	114 (14.6)	0.001 (χ^2 , 14.86)
High school degree	123 (37.8)	366 (46.9)	
University degree or postgraduate	166 (51.1)	301 (38.5)	
Relationship status			
Stable relationship	310 (95.4)	651 (83.4)	0.001 (χ^2 , 29.16)
Unstable relationship/single	15 (4.6)	130 (16.6)	
Primary reason for office evaluation			
Couple infertility	177 (54.5)	344 (44.0)	<0.001 (χ^2 , 195.03)
Sexual dysfunction	10 (3.1)	208 (26.6)	
Benign urologic disorders	23 (7.1)	140 (17.9)	
Urologic cancers	4 (1.2)	28 (3.6)	
Case controls	111 (34.2)	61 (7.8)	
Sexual behaviours protective of STI transmission			
Yes	94 (28.9)	298 (38.2)	0.003 (χ^2 , 8.55)
No	231 (71.1)	483 (61.8)	
HPV knowledge			
Yes	238 (73.2)	326 (41.7)	<0.001 (χ^2 , 91.06)
No	87 (26.8)	455 (58.3)	
Merged HPV awareness			
Yes	282 (86.8)	453 (58.0)	<0.001 (χ^2 , 85.19)
No	43 (13.2)	328 (42.0)	
Mode of knowledge about HPV			
Media/Internet	125 (38.5)	270 (34.6)	<0.001 (χ^2 , 120.15)
Relatives/friends	26 (8.0)	62 (7.9)	
Clinicians	53 (16.3)	44 (5.6)	
School	78 (24.0)	77 (9.9)	
Don't know	43 (13.2)	328 (42.0)	
HPV sexual transmissibility knowledge			
Yes	222 (68.3)	345 (44.2)	<0.001 (χ^2 , 60.17)

Table 2 continued

Gender	Female	Male	p value*
No	25 (7.7)	55 (7.0)	
Don't know	26 (8.0)	62 (7.9)	
HPV-related genital warts knowledge			
Yes	135 (41.5)	152 (19.5)	<0.001 (χ^2 , 67.99)
No	47 (14.5)	90 (11.5)	
Don't know	143 (44.0)	539 (69.0)	
HPV-related female genitalia cancer knowledge			
Yes	225 (69.2)	289 (37.0)	<0.001 (χ^2 , 97.61)
No	18 (5.5)	59 (7.6)	
Don't know	82 (25.3)	433 (55.4)	
HPV-related male penile cancer knowledge			
Yes	70 (21.5)	75 (9.6)	<0.001 (χ^2 , 47.45)
No	112 (34.5)	202 (25.9)	
Don't know	143 (44.0)	504 (64.5)	
HPV-related head and neck cancer knowledge			
Yes	37 (11.4)	69 (8.8)	0.003 (χ^2 , 11.69)
No	49 (15.1)	70 (9.0)	
Don't know	239 (73.5)	642 (82.2)	
HPV vaccine knowledge			
Yes	192 (59.1)	212 (27.1)	<0.001 (χ^2 , 105.22)
No	27 (8.3)	70 (9.0)	
Don't know	106 (32.6)	499 (63.9)	

Data are no. (%)

SD standard deviation (for continuous variables), STI sexually transmitted infections, HPV human papillomavirus

* The p value according to two-tailed Student t test, Mann–Whitney U test, or chi-square test, as indicated

after the approval and market introduction of the HPV vaccine in 2006; they reported that awareness of HPV among European adolescents ranged between 5.4 and 66 %. We anonymously assessed HPV knowledge and awareness in a cohort of adults who were mostly present in an uroandrogenic setting for disorders potentially linked to HPV, after the approval and market introduction of the HPV vaccine. Although these findings cannot be directly translated to the general population, our findings suggest that the level of awareness is still quite inadequate.

We confirmed previous research [13–15] that a significantly higher rate of women reported to know about or were at least aware of HPV infection; likewise, higher educational status was positively associated with awareness. As expected, health professionals—nursing staff only, thus deliberately excluding medical doctors as an entry criterion—were more aware than patients. Our data showed that

Table 3 Logistic regression analyses predicting HPV awareness among the whole cohort of participants

Predictor	Univariable			Multivariable		
	OR	<i>p</i> value	(95 % CI)	OR	<i>p</i> value	(95 % CI)
Age (cont. variable)	0.99	0.26	(0.99; 1.00)	1.01	0.28	(0.99; 1.02)
Age at first sexual intercourse	0.99	0.42	(0.96; 1.02)	0.97	0.12	(0.94; 1.01)
Gender (ref. female)	3.82	<0.001	(2.88; 5.07)	3.08	<0.001	(2.18; 4.35)
Sexual orientation (ref. heterosexual)	0.76	0.49	(0.35; 1.64)	1.23	0.67	(0.46; 3.38)
Educational status						
Secondary school degree or less	–	<0.001		–	<0.001	
High school degree	1.38	0.09	(0.95; 2.02)	1.61	0.03	(1.04; 2.51)
University degree or postgraduate	2.68	<0.001	(1.83; 3.91)	2.89	<0.001	(1.83; 4.57)
Stable relationship status	1.69	0.005	(1.17; 2.38)	1.42	0.16	(0.87; 2.31)
Primary reason for office evaluation						
Case controls	–	<0.001		–	<0.001	
Couple infertility	0.15	<0.001	(0.10; 0.24)	0.20	<0.001	(0.12; 0.33)
Sexual dysfunction	0.14	<0.001	(0.09; 0.23)	0.29	<0.001	(0.16; 0.52)
Benign urologic disorders	0.17	<0.001	(0.10; 0.28)	0.25	<0.001	(0.15; 0.45)
Urologic cancers	0.15	<0.001	(0.06; 0.33)	0.32	0.02	(0.12; 0.83)
Sexual behaviours protective of STI transmission	1.12	0.37	(0.87; 1.43)	1.12	0.63	(0.78; 1.50)

OR odds ratio, CI confidence interval, STIs sexually transmitted infections

84 % of the nursing staff had knowledge and roughly 92 % were aware of the cases. These high values ideally should be 100 % of the healthcare staff, which unfortunately has not yet occurred.

Among aware participants, the Internet and other media, considered as a single category throughout the analyses, emerged as the main source of information about HPV in almost half of the analysed sample, representing the category most chosen by men and by participants with lower educational levels. These findings should be considered especially in view of the progressive importance of the Internet, which is becoming a common source of health-related information [23]. Surveys have shown that the Internet holds great potential to support information gathering and health-related decision-making surrounding health education and self-care, even in the field of STIs [24]. In this context, most websites are mainly devoted to the dissemination of information on the HPV vaccine [25], which can lead to the risk of neglecting most of the background information about the virus itself. Moreover, the websites could also present suboptimal or inaccurate information.

Impressive findings were those concerning the level of awareness about HPV-associated diseases. More specifically, almost half of the participants knew that HPV is sexually transmitted, although most declared themselves ignorant with respect to that item. This eventually becomes extremely frustrating because massive amounts of data have confirmed that anogenital HPV is the most common STI worldwide [1, 2]. Similarly, only a quarter of the participants were aware that HPV infection is potentially related to genital warts. These findings are of major

demographic and public health importance because of the high lifetime risk of HPV-related genital warts in industrialised countries [2, 4].

Human papillomavirus infection can be specifically associated with a number of anogenital [4–6, 26–28] and head and neck [7, 8] cancers. These findings clearly showed that just under half of participants were aware of the risk of HPV-related female genital tumours, but this rate fell dramatically to less than 15 % for tumours of the penis, and even less for cancers of the head and neck region. Both at the direct comparison analyses and at multivariable assessment, female gender emerged as an independent positive predictor of awareness for each specific question. Although proportions data are certainly different among populations and cohorts, this latter finding confirms previous data suggesting that despite poor and various misconceptions, women's awareness is generally higher than men's [15, 29]. As expected, women's awareness was mainly focussed on the risk of cervical cancer [29].

Our results also pointed out that a higher-level education and, above all, the fact of belonging to the field of health professions were independent predictors of awareness regarding HPV. Although the latter findings could be reassuring, considering that a higher level of education is linked with a greater awareness of HPV and, consequently, with a lower risk that HPV may be transmitted or contracted, unfortunately things are not so. Despite the educational level, the fact that controls were represented by health professionals, and although this survey was conducted well after the Food and Drug Administration approval of a quadrivalent vaccine for both genders, and that many

vaccination campaigns are ongoing worldwide, the rate of knowledge of HPV for these two categories virtually considered at less risk is still just over 80 %. Thus, it is still far from 100 %, with school as a source of knowledge in only 40 % of the control group. In this context, it is certainly true that these findings cannot be simply translated to the general population, since the age groups of the participants in this study mean they were probably not in education at the time the vaccine programme was rolled out.

Strengths of this survey include the study design, thus considering a difference between knowledge and awareness, the contemporary evaluation of patients and controls, as well as the historical moment chosen, after approval of the vaccine, after the vaccination campaigns, and after the media blitz that typically follows an aspect of health that concerns sex and sexual health. Furthermore, the vast majority of participants regularly surfed the Internet, with a consequent broad accessibility to the most varied information. Taking all these observations together, our results provoke serious concern and needed reflection on the policy of dissemination of issues concerning prevention.

Most of the patients were heterosexual couples seeking medical help for infertility purposes; interestingly enough, a relatively high incidence of HPV infection was recently demonstrated in heterosexual couples [30] and more specifically in sperm [9, 10] from sexually active men and from infertile patients, with a specific association between HPV infection and impaired sperm parameters. Similarly, patients generally evaluated in an outpatient urologic and andrologic office often require medical help for STIs and penile and genital problems in general. This fact reinforces the importance of our results because this population of patients who are potentially at higher risk still are not familiar enough with “HPV at large”.

Our study is not devoid of limitations. This was a hospital-based study, raising the possibility of selection bias; moreover, all participants were enrolled at a single Italian academic hospital; therefore, several larger studies across different centres and European countries will be needed to substantiate our findings. Of notice is the fact that from 2007 in Italy, HPV vaccination is offered free of charge to all 12-year-old female adolescents, with a possible extension to other age groups according to Regional policies; since then a national information campaign was conducted by means of national TV and radio advertising, the press and leaflets handed out at school with the target to reach at least 80 % of 12-year-old girls to be vaccinated within 5 years since the beginning of the campaign. To this regard, our findings emerged to be even more impressive. As a further limitation, we lack information concerning participants’ recreational habits and sexual habits and behaviours that have been variably associated with a higher risk of anogenital HPV infection and genital cancer in both genders [4, 5].

Conclusions

Our analyses showed that only 51 % of participants of our cohort of non-HPV-screened Caucasian-European adults reported to know what HPV infection is. Only 66.5 % were at even aware of HPV infection. Awareness about the existence and availability of a HPV vaccine is even lower. Although knowledge does not always translate into behaviour change, these findings should certainly lead to a profound rethinking about educational policies and the dissemination of preventive aspects of health and sex education, especially in the field of STIs.

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Conflict of interest All the authors declare that they have no potential conflict of interest.

Ethical standard Data collection followed the principles outlined in the Declaration of Helsinki; all patients signed an informed consent agreeing to share their own anonymous information for future studies.

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