DOI: 10.4081/aiua.2019.4.245

ORIGINAL PAPER

Effect of body mass and physical activity at younger age on the risk of prostatic enlargement and erectile dysfunction: Results from the 2018 #Controllati survey

Fabio Parazzini [1], Walter Artibani [2], Giuseppe Carrieri [3], Luca Carmignani [4], Salvatore Voce [5] on behalf of the #Controllati study group*

[1] Università degli Studi di Milano Dipartimento di Scienze Cliniche e di Comunità, IRCCS Policlinico, Milano, Italy;
[2] Società Italiana di Urologia (SIU), Roma, Italy;
[3] Dipartimento Nefro/Urologico Clinica Urologica e Centro Trapianti di Rene, Università degli Studi di Foggia, Italy;
[4] Università degli Studi di Milano, Unità Operativa Complessa, Ospedale Policlinico San Donato, Milano, Italy;
[5] Divisione di Urologia Ospedale Santa Maria delle Croci, Ravenna, Italy.

Summary ***Objective: Overweight and low physical activity (PA) increase the risk of prostatic enlargement and erectile dysfunction (ED). Less clear is the role of these factors at young age on the lifelong risk.***
Materials and methods: During June 2018 the Italian Society of Urologists organized the month of Male Urologic Prevention "#Controllati". Men aged 18 years or more were invited to attend urologic centers for a visit and counselling about urologic/andrologic conditions. Each participating man underwent a physical examination and was asked about urologic symptoms, sexual activity and possible related problems.
Results: We analyzed data from 2786 men, aged 55.1 years (SD 10.9, range 19-97). A total of 710 (25.5%) subjects had a diagnosis of prostatic enlargement and 632 (22.7%) of DE. Overweight/obese men were at increased risk of prostatic enlargement and ED with corresponding odds ratio (0R) in comparison with normal or underweight men, being respectively 1.18 (95% Confidence Interval (CI) 1.00-1.44) and 1.69 (95% CI 1.39-2.05). The OR of prostatic enlargement in comparison with men reporting at age 25 a BMI < 25.0 was 1.22 (95% CI 1.01-1.51) for men with a BMI at 25 years of age ≥ 25; the corresponding OR value for ED was 1.17 (0.92-1.48). Considering total PA at diagnosis, the OR of prostatic enlargement in comparison with no or low PA, was 0.69 (95%CI 0.55-0.86) for men reporting moderate PA and 0.75 (95%CI 0.58-0.98) for those reporting intense PA. When we considered PA at 25 years of age, the OR of subsequent diagnosis of prostatic enlargement, in comparison with men reporting no/low PA at 25 years of age was 0.81 (95%CI 0.63-1.04) for men reporting moderate PA and 0.70 (95%CI 0.52-0.99) for those reporting intense PA.
Conclusions: These findings underline the utility of encouraging healthy lifestyle habits among young men in order to reduce the subsequent risk of prostatic enlargement and ED.

KEY WORDS: Benign prostatic enlargement; Hypertension; Diabetes; Heart disease; Body mass index; Physical activity.

Submitted 10 April 2019; Accepted 1 May 2019

INTRODUCTION

Benign prostatic enlargement (BPE) and *erectile dysfunction* (ED) are the two most common urologic diseases in men, the estimated prevalence of PE being about 10% in the fourth decades increasing up to 50% thereafter and that of ED being 12% (1, 2).
Among the risk factors for these two conditions, lifestyles play a major role.
It is well recognized, for example, that overweight, low *physical activity* (PA), hypertension, hypercholesterolemia and hypertriglyceridemia increase the risk of these conditions at advanced age (3-6).
Less clear is the role of these factors on the lifelong risk when they were present at younger age (7).
Since 2016 the *Italian Urologic Society (SIU, Società Italiana di Urologia)* coordinates a huge preventive initiative: the month of *Male Urologic Prevention "#Controllati"* (8, 9).
In the framework of this preventive campaign data have been collected on determinants of the risk of prostatic enlargement and ED.
In this paper we present the results of the 2018 initiative with a special focus on risk factors for prostatic enlargement and ED and on lifelong risk for these condition in relation to lifestyle at younger age.

METHODS

During June 2018, men aged 18 year or more were invited to attend the participating urologic centers for a free of charge visit and counselling about urologic or andrologic conditions.
A pamphlet inviting men for check-up was distributed in chemists and general practitioners' waiting rooms. An advertising campaign was also set on media.
At visit, general data were recorded using a simple questionnaire. The first section of the questionnaire, including data on age, life habits height and weight, was completed by the patient. The section on PA included questions on self-reported intensity of PA ('none', 'low', 'moderate','intense') at work and in leisure time separately. History of hypertension, diabetes, cardiopathy, hypertriglyceridemia and hypercholesterolemia were checked by the urologist. Information was also collected on *body mass index* (BMI) and total PA at age 25 year among men aged 30 year or more.

No conflict of interest declared.

Each participating man underwent a physical examination, including *digital rectal examination* (DRE), and was asked by the urologist about urologic symptoms, sexual activity and possible related problems. Diagnosis of prostatic enlargement was made by the urologist by DRE.
Erectile function was assessed by asking men about their sexual performance: ED was diagnosed, according to the definition of the *NIH Consensus Development Panel* (10), when a man was consistently unable to attain or maintain a penile erection sufficient for satisfactory sexual performance.
The 2002 ICS definitions were used for frequency, nicturia, urgency, dysuria (intermittency, slow stream, straining, terminal dribble, postmicturition dribble) incomplete emptying (11).
A man was considered a smoker if he had smoked more than one cigarette/day for at least one year; ex-smoker if he had smoked more than one cigarette/day for at least one year, but had stopped more than one year before the interview, and non-smoker if he had never smoked more than one cigarette/day.
Total PA was evaluated combining occupational and leisure time PA. Frequencies (%) were computed as appropriate. *Odds ratios* (OR), and the corresponding 95% *confidence intervals* (CI), adjusted for age were derived using unconditional multiple logistic regression, fitted by the method of maximum likelihood, in which the dependent variable was the presence (case) or absence (control) of the condition and the independent ones were the exposures considered in the analysis. We included in the model age considered as categorical variable (12).

Results

During the 2018 campaign a total of 3092 men entered the study. After exclusion of men who underwent previous surgery for partial or complete prostatectomy and those who did not answer at least one of two questions about PA, we analyzed data from 2786 men, aged 55.1 years (SD 10.9, range 19-97). The reason for visit was urinary symptoms in 504 (18.1%), sexual problems in 270 (9.7%), renal disease in 68 (2.4%) and prostatic problems in 429 (15.4%) (more than one reason was allowed). Prevention was the only reason for consultation in 1776 subjects (63.8%). A total of 710 (25.5%) subjects had a diagnosis of prostatic enlargement and 632 (22.7%) of DE. Table 1 shows the distribution, and the corresponding OR, of study subjects according to the diagnosis of prostatic enlargement, ED and age, smoking habits and BMI.
The risk of prostatic enlargement and ED increased with age: in comparison with men aged <=40 years or less, the risk of prostatic enlargement was 2.57, 7.22, 17.97 and 39.1 in the age classes 41-50, 51-60, 61-70 and >=71, respectively. The corresponding values for ED were 1.15, 1.63, 3.06 and 4.87.
Smoking increased the risk of ED: in comparison with never smokers, ex-smokers had an increased risk of ED of 1.38 (95%CI 1.11-1.69) and current smokers of 1.92 (95%CI 1.49-2.48).
Overweight/obese men were at increased risk of prostatic enlargement and ED the corresponding 0R, in comparison with normal or underweight men, being respectively 1.18 (95%CI 1.00-1.44) and 1.69 (95%CI 1.39-2.05).
We have also considered (among men aged 30 years or more) the role of overweight/obesity at 25 years of age on the subsequent risk of prostatic enlargement and ED.
In comparison with men reporting at age 25 a BMI < 25.0, the OR of prostatic enlargement was for men with a BMI at 25 years of age ≥ 25, 1.22 (95%CI 1.01-1.51); the corresponding value for ED was 1.17 (95%CI 0.92-1.48).
Table 2 considers the relation between prostatic enlargement and DE and urinary symptoms, hypertension, diabetes, cardiopathy, hypertriglyceridemia and hypercholesterolemia.

Table 1.
Odds ratios (and corresponding 95% confidence intervals) of BPE and erectile dysfunction according to selected factors.

	Benign prostatic enlargement				Age adj OR (95%CI)	Erectile dysfunction				Age adj OR (95%CI)
	No		Yes			No		Yes		
	No.*	(%)	No.*	(%)		No.*	(%)	No.*	(%)	
Age (years)										
≤ 40	166	7.8	7	0.9	1°	150	6.8	23	3.5	1°
41-50	782	36.8	87	11.5	2.57 (1.17-5.66)	736	33.2	133	20.0	1.15 (0.71-1.85)
51-60	718	33.8	225	29.6	7.22 (3.34-15.63)	752	33.9	191	28.7	1.63 (1.02-2.60)
61-70	339	16.0	269	35.4	17.97 (8.29-38.96)	413	18.6	195	29.3	3.06 (1.91-4.90)
≥ 71	118	5.6	171	22.5	35.10 (15.83-77.86)	165	7.4	124	18.6	4.87 (2.94-8.06)
Smoking habits										
Never	1131	53.3	342	45.1	1°	1198	54.1	275	41.3	1°
Ex smokers	624	29.4	303	39.9	1.2 (0.98-1.47)	668	30.1	259	38.9	1.38 (1.12-1.69)
Current smokers	343	16.2	103	13.6	1.1 (0.84-1.47)	317	14.3	129	19.4	1.92 (1.49-2.48)
< 10 cig/day	127	8.5	34	7.5	0.94 (0.58-1.53)	130	8.5	31	7.6	1.49 (0.96-2.29)
≥ 10 cig/day	192	12.9	67	14.8	1.27 (0.90-1.78)	174	11.3	85	21.0	2.25 (1.66-3.06)
BMI (kg/m^2)										
< 25.0	891	43.2	253	35.8	1°	949	44.1	195	30.8	1°
≥ 25.0	1172	56.8	453	64.2	118. (1.00-1.44)	1189	55.2	436	69.0	1.69 (1.39-2.05)
BMI at 25 years of age										
< 25.0	1293	62.3	443	62.4	1°	1335	62.0	401	63.4	1°
≥ 25.0	384	18.5	123	17.3	1.22 (1.01-1.51)	381	17.7	126	19.9	1.17 (0.92-1.48)

**Sometimes, the sums do not add up the total due to missing values; °reference category OR: odds ratio; CI: confidence interval.*

Table 2.
Odds ratios (and corresponding 95% confidence intervals) of BPE and erectile dysfunction according to medical history.

	Benign prostatic enlargement				adj OR (95%CI)	Erectile dysfunction				adj OR (95%CI)
	No		Yes			No		Yes		
	No.* (%)		No.* (%)			No.* (%)		No.* (%)		
Urinary symptoms**										
No	987	46.5	101	13.3	1°	924	41.7	164	24.6	1°
Yes	1136	53.5	658	86.7	5.14 (3.97-6.67)	1292	58.3	502	75.4	1.82 (1.47-2.25)
Erectile dysfunction										
No	1698	80.0	518	68.2	1°	-	-	-	-	-
Yes	425	20.0	241	31.8	1.27 (1.03-1.57)	-	-	-	-	-
Benign prostatic enlargement										
No	-	-	-	-	-	1698	76.6	425	63.8	1°
Yes	-	-	-	-	-	518	23.4	241	36.2	1.27 (1.03-1.57)
Hypertension										
No	1492	70.3	369	48.6	1°	1524	68.8	337	50.6	1°
Yes	407	19.2	275	36.2	1.6 (1.30-2.619)	457	20.6	225	33.8	1.60 (1.29-1.99)
Missing	224	10.6	115	15.2		235	10.6	104	15.6	--
Diabetes										
No	1884	88.7	599	78.9	1°	1964	88.6	519	77.9	1°
Yes	78	3.7	80	10.5	1.57 (1.08-1.85)	82	3.7	76	11.4	2.43 (1.70-3.47)
Missing	161	7.6	80	10.5		170	7.7	71	10.7	-
Cardiopathy										
No	1857	87.5	577	76.0	1°	1925	86.9	509	76.4	1°
Yes	76	3.6	74	9.7	1.30 (1.02-1.67)	80	3.6	70	10.5	2.12 (1.47-3.06)
Missing	190	8.9	108	14.2		211	9.5	87	13.1	-
Hypertriglyceridemia										
No	1753	82.6	586	77.2	1°	1830	82.6	509	76.4	1°
Yes	130	6.1	62	8.2	1.31 (0.92-1.85)	130	5.9	62	9.3	1.59 (1.13-2.22)
Missing	240	11.3	111	14.6		256	11.6	95	14.3	-
Hypercholesterolemia										
No	1548	72.9	492	64.8	1°	1613	72.8	427	64.1	1°
Yes	301	14.2	143	18.8	1.30 (1.02-1.67)	315	14.2	129	19.4	1.42 (1.11-1.81)
Missing	274	12.9	124	16.3		288	13.0	110	16.5	-

**Sometimes, the sums do not add up the total due to missing values; **one or more of the followings: nocturia, urgency, dysuria (intermittency, slow stream, straining, terminal dribble, postmicturition dribble) incomplete emptying; °reference category; adjOR: adjusted odds ratio; CI: confidence interval.*

Table 3.
Odds ratios (and corresponding 95% confidence intervals) of premature ejaculation and erectile dysfunction according to physical activity.

	Benign prostatic enlargement				adj OR (95%CI)	Erectile dysfunction				adj OR (95%CI)
	No		Yes			No		Yes		
	No.* (%)		No.* (%)			No.* (%)		No.* (%)		
Occupational PA										
None/Low	1002	48.3	354	49.9	1°	1035	48.1	321	50.8	1°
Moderate	631	30.4	198	27.9	0.89					
(0,7-1,1)	657	30.5	172	27.2	0.86 (0.69-1.08)					
Intense	283	13.6	80	11.3	0.97 (0.72-1.31)	286	13.3	77	12.2	0.98 (0.73-1.30)
Missing	160	7.7	78	11.0		176	8.2	62	9.8	-
Leisure PA										
Low	767	36.9	317	44.6	1°	785	36.4	299	47.3	1°
Moderate	893	43.0	272	38.3	0.67 (0.55-0.83)	926	43.0	239	37.8	0.66 (0.54-0.80)
Intense	319	15.4	84	11.8	0.64 (0.51-0.91)	342	15.9	61	9.7	0.48 (0.36-0.66)
Missing	97	4.7	37	5.2		101	4.7	33	5.2	-
Total PA										
Low	537	25.9	228	32.1	1°	544	25.3	221	35.0	1°
Moderate	960	46.2	308	43.4	0.69 (0.55-0.86)	995	46.2	273	43.2	0.65 (0.53-0.80)
Intense	515	24.8	144	20.3	0.75 (0.58-0.98)	545	25.3	114	18.0	0.56 (0.43-0.72)
Missing	64	3.1	30	4.2		70	3.2	24	3.8	-
PA at 25 years of age										
Low	401	19.3	160	22.5	1°	415	19.3	146	23.1	1°
Moderate	820	39.5	273	38.5	0.81 (0.63-1.04)	858	39.8	235	37.2	0.78 (0.61-0.99)
Intense	773	37.2	244	34.4	0.70 (0.52-0.99)	785	36.4	232	36.7	0.74 (0.58-1.10)
Missing	82	3.9	33	4.6		96	4.5	19	3.0	-

**Sometimes, the sums do not add up the total due to missing values; °reference category; adjOR: adjusted odds ratio; CI: confidence interval.*

A history of hypertension, diabetes, cardiopathy, high cholesterol levels were significantly associated to an increased risk of prostatic enlargement in the total series. Likewise, hypertension, diabetes, cardiopathy, high triglyceride and cholesterol levels were significantly associated to an increased risk of ED.

PA was significantly associated with a decreased risk of prostatic enlargement: considering the total PA at diagnosis, the OR of prostatic enlargement, in comparison with men reporting no or low PA, was 0.69 (95%CI 0.55-0.86) among men reporting moderate PA and 0.75 (95%CI 0.58-0.98) among those reporting intense PA.
The OR of subsequent diagnosis of prostatic enlargement were, in comparison with men reporting no/low PA at 25 years of age 0.81 (95%CI 0.63-1.04) for men reporting moderate PA and 0.70 (95%CI 0.52-0.99) for those reporting intense PA at 25 years of age. Similar findings emerged when we considered ED risk.

Discussion

The general results of this analysis show that low PA, high BMI and a history of hypertension, diabetes, hypercholesterolemia, cardiopathy increase the risk of prostatic enlargement. High BMI and low PA at 25 year of age increase the risk of prostatic enlargement at older ages. Similar results emerged also for the risk profile of ED.

Limitations

As already discussed in the papers presenting the results of 2016 and 2017 initiative (8, 9), the major flaw of this study is that the study population were men voluntarily presenting to the participating centers. The participating centers were not randomly identified among all Italian urologic centers, so they cannot be considered representative of all Italian centers. However, they were well distributed over the main areas of the country. In any case, any inference from the present analysis must be made in strictly comparative terms and strictly referred to men attending urologic services.
The diagnosis of PE was based on DRE that tends to underestimate the prostatic volume (2). Any misclassification of men with or without BPE or should lower the observed associations. With regard to the diagnosis of DE, it was reported by the men and checked for standard criteria by the physician.
The results of this study confirm data from different populations that have reported that high BMI, low PA and a history of hypertension, diabetes, hypercholesterolemia, increase the risk of BPE at all ages (13, 14). All these findings underline that benign BPE shares similar risk factors with metabolic syndrome and cardiovascular diseases.
The etiological mechanisms that links these risk factors and prostatic growth are not completely understood. However, it has been shown that lipids (oxidized low-density lipoproteins) increase in vitro the secretion of growth and pro-inflammatory factors by human stromal BPE cells in culture (15). Along this line, in a clinical perspective, the addition of statins to standard therapy for benign PE lowered prostate volume (16). Further, alteration of sex steroid hormone metabolism caused by both obesity and diabetes could lead to 'pro-inflammatory' conditions, causing release of chemokines potentially associated with prostate enlargement (17).
Regular PA has been consistently reported to decrease the risk of BPE. A meta-analysis has shown that moderate-to-vigorous physical activity was associated with up to a 25% decreased risk of benign prostatic enlargment, with the magnitude of the protective effect increasing with the higher levels of activity (18).
An interesting finding from the present study is the observation that the OR of BPE and ED associated with none/low PA and high BMI at 25 years were higher than unity.
Few data have been published on the role of PA at younger ages on the lifetime risk of BPE.
A previous Italian case control study have reported that moderate/intense recreational physical activity (> 2 hours week) at age 30-39 decrease the risk of benign BPE of about 30%. The Authors concluded that avoidance of sedentary lifestyle through a moderate recreational PA at any age may help preventing a sizeable number (e.g., approximately 20%) of BPE cases (7).
With regard to erectile dysfunction, the risk profile of ED was largely similar with that observed for prostatic enlargement. In particular, the present analysis confirms that smoking, overweight, low PA and history of diabetes, hypertension, cardiopathy, hypercholesterolemia, hypertriglyceridemia, all increased the risk of ED.
All these findings underline the role of encouraging healthy lifestyle habits among young men in order to reduce the subsequent risk of prostatic enlargement and ED.

References

1. Parazzini F, Menchini Fabris F, Bortolotti A, et al, Frequency and determinants of erectile dysfunction in Italy. Eur Urol. 2000; 37:43-9.

2. Vuichoud C, Loughlin KR. Benign prostatic hyperplasia: epidemiology, economics and evaluation. Can J Urol. 2015; 22 Suppl 1:1-6.

3. Lee S, Min HG, Choi SH, et al. Central obesity as a risk factor for prostatic hyperplasia. Obesity (Silver Spring) 2006; 14:172-9.

4. Muller RL, Gerber L, Moreira DM, et al. Obesity is associated with increased prostate growth and attenuated prostate volume reduction by dutasteride. Eur Urol. 2013; 63:1115-21.

5. Bourke JB, Griffin JP. Hypertension, diabetes mellitus, and blood groups in benign prostatic hypertrophy. Br J Urol. 1966; 38:18-23.

6. Nandeesha H, Koner BC, Dorairajan LN, Sen SK. Hyperinsulinemia and dyslipidemia in non-diabetic benign prostatic hyperplasia. Clin Chim Acta. 2006; 370:89-93.

7. Dal Maso L, Zucchetto A, Tavani A, et al. Lifetime occupational and recreational physical activity and risk of benign prostatic hyperplasia. Int J Cancer. 2006; 118:2632-2635.

8. Mirone V, Carone R, Carrieri G, et al. Urinary symptoms and sexual dysfunction among Italian men: The results of the #Controllati survey. Arch Ital Urol Androl. 2017; 89:75-80.

9. Mirone V, Carrieri G, Morgia G, et al. Risk factors for benign prostatic enlargement: The role of lifestyle habits at younger age. The #Controllati2017 initiative study group. Arch Ital Urol Androl. 2017; 89:253-258.

10. NIH Consensus Conference (1993) Impotence. Consensus Development Panel on Impotence. JAMA 1993; 270:83-90.

11. Abrams P, Cardozo L, Fall M, et al. The standardisation of terminology of lower urinary tract function: report from the Standardisation Sub-committee of the International Continence Society. Neurourol Urodyn. 2002; 21:167-78.

12. Baker NJ, Nelder JA. The GLIM System. Release 3. Oxford: Numerical Algorithms Group; 1978.

13. Raheem OA, Parsons JK. Associations of obesity, physical activity and diet with benign prostatic hyperplasia and lower urinary tract symptoms. Curr Opin Urol. 2014; 24:10-4.

14. Parsons JK, Carter HB, Partin AW, et al. Metabolic factors associated with benign prostatic hyperplasia. J Clin Endocrinol Metab. 2006; 91:2562-8.

15. Vignozzi L, Gacci M, Cellai I, et al. Fatboosts, while androgen receptor activation counteracts, BPH-associated prostate inflammation. Prostate. 2013; 73: 789-800.

16. Lee SH, Park TJ, Bae MHm, et al. Impact of treatment with statins on prostate-specific antigen and prostate volume in patients with benign prostatic hyperplasia. Korean J Urol. 2013; 54:750-5.

17. Jerde TJ, Bushman W. IL-1 induces IGF-dependent epithelial proliferation in prostate development and reactive hyperplasia. Sci Signal. 2009; 2:ra49.

18. Parsons JK, Kashefi C. Physical activity, benign prostatic hyperplasia, and lower urinary tract symptoms. Eur Urol. 2008; 53:1228-1235.

***Participating centers:**

A.O.U. Città della Salute e della Scienza - Ospedale Molinette, Torino (Gontero Paolo)
Arcispedale Sant'Anna Ferrara (Ippolito Carmelo)
ASL Reggio Calabria (De Martin Michele)
P.O. Umberto I, Nocera Inferiore (Sanseverino Roberto)
ASL Presidio Ospedaliero Carmagnola, Chieri (Marino Gaetano)
ASST Franciacorta - Ospedale M. Mellini (Chiari Tralce Luigi)
Ospedale Mater Salutis Legnago (Curti Pierpaolo)
Aurelia Hospital, Roma (Cusumano Roberto)
Azienda Ospedaliera Universitaria di Sassari (Madonia Massimo)
Azienda Ospedaliera "Umberto I" Siracusa (Lentini Bartolomeo)
Azienda Ospedaliera Universitaria, Parma (Maestroni Umberto Vittorio)
Azienda Ospedaliera, Padova (Zattoni Filiberto)
Azienda Ospedaliera Gaetano Rummo Benevento (Salzano Luigi)
Azienda Ospedaliera Ospedali Riuniti Papardo Piemonte, Messina (Mastroeni Francesco)
Azienda Ospedaliera Policlinico di Bari (Ditonno Pasquale)
Azienda Ospedaliera Policlinico di Bari (Battaglia Michele)
Azienda Ospedaliera Pugliese Ciaccio Catanzaro (Pirritano Domenico)
Azienda Ospedaliera S. Antonio e Biagio, Alessandria (Serao Armando)
Azienda Ospedaliera S. Bortolo, Vicenza (Ferrarese Paolo)
Azienda Ospedaliera S. Giuseppe Moscati, Avellino (Cicalese Virgilio)
Azienda Ospedaliera Sant'Anna e San Sebastiano di Caserta (Caggiano Sergio)
Azienda Ospedaliera Santa Maria Terni (Elisabetta Costantini)
Azienda Ospedaliera-Universitaria - "L. Vanvitelli" Napoli (De Sio Marco)
Azienda Ospedaliera-Universitaria Integrata Verona (Artibani Walter)
Azienda Ospedaliera-Universitaria Mater Domini di Catanzaro (Damiano Rocco)
Azienda Ospedaliera-Universitaria Policlinico G. Martino Messina (Ficarra Vincenzo)
Azienda Ospedaliero-Universitaria "Policlinico - Vittorio Emanuele" Catania (Falsaperla Mari)
Azienda Ospedaliero-Universitaria Careggi, Firenze (Carini Marco)
Azienda Ospedaliero-Universitaria S. Luigi Gonzaga Orbassano (Porpiglia Francesco)
Azienda Ospedaliero-Universitaria Maggiore della Carità, Novara (Volpe Alessandro)
Azienda Ospedaliero-Universitaria Pisana - Stabilimento di Cisanello (Selli Cesare)
Azienda Ospedaliero-Universitaria Sant' Andrea, Roma (Tubaro Andrea)
Ospedale Civile di Voghera (Mensi Mario)
Azienda Socio Sanitaria Territoriale Santi Paolo e Carlo, Milano (Dormia Guido)
Campus Università degli Studi "Gabriele d'Annunzio" Chieti (Raffaele Tenaglia)
Casa di Cura Ambrosiana Cesano Boscone (Catanzaro Francesco)
Casa di Cura Gibiino Catania (Ranno Christian)
Casa di Cura Giovanni XXIII, Monastier di Treviso (Morana Carmelo)
Casa di Cura Guarnieri, Roma (Di Marco Massimiliano)
Casa di Cura Luigi Cobellis Vallo della Lucania (Cavaliere Aniello)
Casa di Cura Malatesta Novello Cesena (Cuzzocrea Diego)
Casa di Cura Musumeci Gecas Gravina di Catania (Leonardi Rosario)
Casa di Cura Nuova Clinica Santa Rita Benevento (Coscione Mario)
Casa di Cura Nuova Villa Claudia, Roma (Giulianelli Roberto)
Casa di Cura Regina Pacis, San Cataldo (Cammarata Carla)
Casa di Cura Romolo Hospital Rocca di Neto (Cappa Manlio)
Casa di Cura S. Rita, Atripalda De Simone Elia Virginio;
Casa di Cura San Camillo Messina (Bruschetta Sebastiano);
Casa di Cura Santa Lucia San Giuseppe Vesuviano (Casoli Eugenio)
Casa di Cura Sileno ed Anna Rizzola, San Donà di Piave (Loiero Gaetano)
Casa di Cura Trusso, Ottaviano (De Stefano Giacomo)
Casa Di Cura Villa Betania, Roma (Buscarini Maurizio)
Casa di Cura Villa dei Fiori, Mugnano di Napoli (Jungano Renato)
Casa di Cura Villa Esther, Avellino (Di Martino Mario)
Casa di Cura Villa Fiorita, Prato (Dami Andrea Cesare)
Casa di Cura Villa Igea, Ancona (Cafarelli Angelo)
Casa di Cura Villa Maria, Mirabella Eclano (Morelli Emilio)
Casa di Cura Villa Stabia Castellammare di Stabia (Scognamiglio Giuseppe)
Centro Medico Politerapica, Seriate (Paolo Belvisi)
Clinica Athena Villa dei Pini, Piedimonte Matese (Dalena Giuseppe)
Clinica Padre Pio, Mondragone (Sepe Giuseppe Salvatore)
Clinica Pierangeli, Pescara (Pompa Paolo)
Clinica Villa Pia, Roma (Campagna Adriano)
Casa di Cura Pederzoli, Peschiera del Garda (Grosso Gaetano)
Ospedale Generale Regionale F. Miulli, Acquaviva delle Fonti (Ludovico Giuseppe Mario)
Ospedale Galliera, Genova (Introini Carlo);
Fondazione Policlinico IRCCS, Milano (Montanari Emanuele);
Fondazione PTV Policlinico, Tor Vergata, Roma (Vespasiani Giuseppe);
Grande Ospedale Metropolitano Bianchi Melacrino Morelli, Reggio Calabria (Cozzupoli Pietro);
Hesperia Hospital, Modena (Ferrari Giovanni);
Humanitas Gradenigo, Torino (Muto Giovanni);
Humanitas San Pio X, Milano (Nava Luciano);
IRCCS Policlinico San Donato (Carmignani Luca);
IRCCS Policlinico Milano (Elena Ricci, data analysis);
IRCCS AOU San Martino IST, Genova (Terrone Carlo);
Istituti Clinici Zucchi, Monza (Stefano Casellato);
Istituto Clinico S. Anna, Brescia (Najati Alrabi);
Istituto Europeo di Oncologia, Milano (De Cobelli Ottavio);
Istituto Nazionale Tumori IRCCS "Fondazione Pascale" Napoli (Perdonà Sisto);
Ospedale Casa Sollievo della Sofferenza, San Giovanni Rotondo (Cisternino Antonio);
Ospedale Buon Consiglio Fatebenefratelli, Napoli (Imperatore Vittorio);
Ospedale Cardarelli, Napoli (Fedelini Paolo);
Ospedale Carlo Urbani, Jesi (Ferrara Vincenzo);
Ospedale Civico di Cristina Benfratelli , Palermo (Gianfranco Savoca);
Ospedale Civile di Guastalla (Frattini Antonio);
Ospedale Civile P.O. Dell'Annunziata, Cosenza (Emilio De Giacomo);
Ospedale Civile Ramazzini Carpi (Barusi Maurizio);
Ospedale Civile S. Giacomo, Monopoli (Vito Domenico Ricapito);
Ospedale Civile San Salvatore, L'Aquila (Di Clemente Luigi);
Ospedale Cottolengo, Torino (Scoffone Cesare Marco);
Ospedale degli Infermi, Rimini (Montanari Francesco);
Ospedale del Mare, Napoli (Zito Aniello Rosario) ;
Ospedale della Murgia Fabio Perinei, Altamura (De Siati Mario);
Ospedale di Bassano del Grappa (Celia Antonio);
Ospedale di Belcolle, Viterbo (Rizzotto Antonio);
Ospedale di Senigallia (Vincenzo Ferrara);
Ospedale di Sondrio (Giumelli Pierluigi);
Ospedale di Villafranca di Verona (Pecoraro Giuseppe);
Ospedale Cristo Re, Roma (Lorenzo Defidio);
Ospedale Don Tonino Bello Molfetta (Altomare Mauro);
Ospedale Garibaldi Nesima, Catania (La Rosa Pasquale Gianfranco);
Ospedale ICOT, Latina (Carbone Antonio);
Ospedale L. Bonomo, Andria (Corvasce Antonio);
Ospedale Madonna delle Grazie, Matera (Disabato Giuseppe);
Ospedale Maggiore, Bologna (Emili Emilio);

Ospedale Maria SS. Addolorata, Erboli (Tufano Antonio);
Ospedale Niguarda Ca' Granda, Milano (Bocciardi Aldo);
Ospedale Privato Accreditato Villa Regina, Bologna (Cuzzocrea Diego Ettore);
Ospedale Villa Serena, Forlì (Zambelli Massimo);
Ospedale S. Giacomo di Novi Ligure (Montefiore Franco);
Ospedale S. Giovanni in Persiceto (Emilo Emili);
Ospedale S. Maria della Misericordia, S. Andrea delle Fratte Perugia (Ettore Mearini);
Ospedale S. Maria delle Croci, Ravenna (Voce Salvatore);
Ospedale S. Raffaele Turro, Milano (Gaboardi Franco);
Ospedale Sacro Cuore di Gesù Fatebenefratelli, Benevento (Ferravante Paolo);
Ospedale Sacro Cuore Don Calabria, Negrar (Cavalleri Stefano);
Ospedale San Bartolomeo, Sarzana (Conti Enrico);
Ospedale San Biagio DomodossolaRosa Antonio;
Ospedale San Camillo Forlanini, Roma (Gaffi Marco);
Ospedale San Donato, Arezzo (De Angelis Michele);
Ospedale San Giacomo Apostolo, Castelfranco Veneto (Luca De Zorzi);
Ospedale San Giovanni Battista, Foligno (Mearini Luigi);
Ospedale San Giovanni di Dio, Agrigento (Ruoppolo Michele);
Ospedale San Pio da Pietrelcina, Vasto (Schips Luigi);
Ospedale San Raffaele, Milano (Montorsi Francesco);
Ospedale San Salvatore. Pesaro (Beatrici Valerio);
Ospedale San Tommaso dei Battuti, Portogruaro (Amenta Michele);
Ospedale Sant'Ottone Frangipane, Ariano Irpino (Grasso Gerardo);
Ospedale Santa Maria Misericordia, Udine (Valotto Claudio);
Ospedale Santa Maria Regina degli Angeli, Adria (Meneghini Agostino);
Ospedale Santissima Trinità, Cagliari (De Lisa Antonello);
Ospedale Spoke, Locri (Capocasale Francesco);
Ospedale SS. Capitanio e Gerosa, Lovere (Ranieri Antonio);
Ospedale Vincenzo Monaldi, Napoli (Uricchio Francesco);
Ospedali Riuniti di Ancona (Galosi Andrea Benedetto);
Ospedali Riuniti di Foggia (Carrieri Giuseppe),
Presidio Ospedaliero Cerignola (Annunziata Gennaro);
P.O. S. Marta e S. Venera di Acireale (Ingrassia Antonino);
P.O. Umberto I, Enna (D'Anca Michele);
Policlinico Agostino Gemelli, Roma (Bassi Pierfrancesco);
Policlinico di Abano Terme (Porreca Angelo);
Ospedale Civile di Baggiovara (Bianchi Giampaolo);
Policlinico Federico II, Napoli (Mirone Vincenzo);
Policlinico S. Orsola-Malpighi, Bologna (Brunocilla Eugenio);
Policlinico SS. Annunziata, Chieti (Schips Luigi);
Polo Pontino - Ospedale ICOT, Latina (Carbone Antonio);
Presidio Ospedaliero "Vittorio Emanuele", Gela (Condorelli Sebastiano);
Policlinico “Vittorio Emanuele”, Catania (Morgia Giuseppe);
Presidio Ospedale S.S. Pietro e Paolo, Borgosesia (Cipollone Giovanni),
Presidio Ospedaliero Carlo Poma, Mantova (Dall'Oglio Bruno)
Presidio Ospedaliero CTO - Unità Spinale Struttura di Neuro Urologia, Torino (Carone Roberto);
Presidio Ospedaliero di Brescia (Simeone Claudio);
Presidio Ospedaliero di Busto Arsizio (Buizza Carlo);
Presidio Ospedaliero di Pescara (Renzetti Roberto);
Presidio Ospedaliero Mazzini, Teramo (Vicentini Carlo);
Presidio Ospedaliero Occidentale, Castellaneta (Di Lena Sebastiano);
Presidio Ospedaliero Perrino, Brindisi (Brigante Salvatore);
Presidio Ospedaliero S. Andrea, Vercelli (Cipollone Giovanni);
Ospedale S. Maria del Prato, Feltre (Xausa Daniele);
Villa Pini D'Abruzzo, Chieti (Marascia Gabriele).

Correspondence
Fabio Parazzini, MD (Corresponding Author)
fabio.parazzini@unimi.it
Dipartimento di Scienze Cliniche e di Comunità, Università di Milano,
Fondazione IRCCS Ca’ Granda Ospedale Maggiore Policlinico
Via Commenda 12, 20122 Milano (Italy)

Walter Artibani, MD
segreteria@siu.it
Società Italiana di Urologia (SIU), Roma (Italy)

Giuseppe Carrieri, MD
giuseppe.carrieri@unifg.it
Dipartimento Nefro/Urologico Clinica Urologica e Centro Trapianti di Rene
Università degli Studi di Foggia (Italy)

Luca Carmignani, MD
luca.carmignani@unimi.it
Università degli Studi di Milano, Unità Operativa Complessa
Ospedale Policlinico San Donato, Milano (Italy)

Salvatore Voce, MD
salvatore.voce@auslromagna.it
Divisione di Urologia Ospedale Santa Maria delle Croci, Ravenna (Italy)