Prostate-Specific Antigen

Nonspecific in Deceased Organ Donors

K. Pabisiak[a,e,*], M. Ostrowski[b], A. Kram[c], K. Safranow[d], M. Myślak[a], J. Sieńko[b], T. Sulikowski[b], and K. Ciechanowski[a]

[a]Department of Nephrology Transplantation and Internal Medicine, Pomeranian Medical University, Szczecin, Poland; [b]Department of General Surgery and Transplantation, Pomeranian Medical University, Szczecin, Poland; [c]West Pomeranian Oncology Center, Szczecin, Poland; [d]Department of Biochemistry and Medical Chemistry, Pomeranian Medical University, Szczecin, Poland; and [e]Polish Transplant Coordinating Center-Poltransplant, Warsaw, Poland

ABSTRACT

Currently, there is no clear position regarding the donation of organs from donors with prostate carcinoma (CaP) in European countries, except Italy. The lengthening of life expectancy increases the probability of prostate cancer among potential organ donors. The concentration of prostate-specific antigen (PSA) >2 ng/mL at 60 years of age is related to the increasing possibility of identifying an advanced form of CaP. In recent years in Poland, the recommendation has been to determine tumor markers in potential donors. In the first year of the recommendation, 10% of potential male cadaveric donors were disqualified in West Pomerania, Poland, on the basis of elevated PSA levels (>10 ng/mL). To avoid reduction of the actual donor pool, each potential male donor reported to the center since January 2010 undergoes a routine histologic evaluation of the whole prostate, regardless of the PSA level, before organ implantation. In the study group (N = 52), histopathologic evaluation revealed 6 cases of CaP (12%). In CaP positive group Gleason score range from 2+2 to 3+4. In CaP donors PSA level have been noticed in range 1.79 ng/mL – 7.66 ng/mL. There was no correlation between histologically confirmed CaP and the PSA level.

THE DIAGNOSIS OF CANCER is usually a contraindication for organ donation but not all forms of donor neoplasia should be regarded as an absolute disqualification for organ transplantation. The biology of prostate cancer is characterized by slow tumor grow and low metastatic potential [1]. The concentration of prostate-specific antigen (PSA) >1 ng/mL at the age of 40 years and >2 ng/mL at the age of 60 years are values that correlate with the possibility of identifying an advanced form of cancer [2]. In Poland, >45% of organ donors are aged >50 years, and the percentage of donors aged >65 years in the last 5 years has risen 6-fold [3]. The lengthening of life expectancy increases the probability of prostate cancer among organ donors in the European population. The projected increase in the incidence of prostate carcinoma (CaP) in 2020 is estimated to 25% [4].

Currently, there are no guidelines for donation from CaP positive donors. a CaP diagnosis in European countries, except in Italy [5]. The European Parliament published safety recommendations aimed at reducing the risk of cancer transmission with donated organs; the final decision about qualification, however, belongs to the transplantation team. In Poland, the recommendation since 2009 has been to determine tumor markers in potential donors. In the first year of the recommendation, 10% of male potential deceased donors were disqualified in our center on the basis of elevated PSA levels (>10 ng/mL). To avoid reductions in the actual donor pool, each male donor reported to our center during the selection procedure undergoes routine histologic evaluation of the prostate, regardless of the PSA level. The aim of the present study was to determine the

*Address correspondence to Krzysztof Pabisiak, Pomeranian Medical University Szczecin, Al. Powst. Wlkp. 72, 70-111 Szczecin, Poland. E-mail: bkpn@pum.edu.pl

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Table 1. Study Group Demographic Characteristics and Clinical Data (N = 52)

Characteristic	Value
Age, y	54 (20–68)
Total PSA, ng/mL	4.63 (0.33–58)
Serum creatinine, mg/dL	1.1 (0.5–1.9)
Duration of indwelling catheter, d	4 (2–19)
Cause of death, no. (%)	
CVA	21 (40%)
Trauma	26 (50%)
Other	5 (10%)
Histopathology, no. (%)	
BPH	24 (46%)
HGPIN	7 (13%)
CaP	6 (12%)
Normal	15 (29%)

Values are given as median (range) unless otherwise indicated.
Abbreviations: CaP, prostate carcinoma; CVA, cerebrovascular accident; BPH, benign prostatic hyperplasia; HGPIN, high-grade prostatic intraepithelial neoplasia; PSA, prostate-specific antigen.

incidence and advancement of prostate cancer in relation to the level of PSA in organ donors.

MATERIALS AND METHODS

The study group included all actual male organ donors referred to the local transplantation center in the period from January 2010 to January 2014 (N = 52). During the qualification procedure, total PSA concentrations were measured in each case. During organ recovery, the whole prostate gland with seminal vesicles was removed, immersed in saline, and sent to the "on-call" pathologist. Results of the pathologist's assessment were available for inspection within 60 min after organ delivery.

Demographic and clinical data that may affect the PSA concentration were collected. Categorical data that are not normally distributed were expressed as medians. For statistical purposes, the Mann-Whitney *U* test and Spearman's correlation, with significance levels set at $P < .05$, were performed. The data were analyzed by using Statistica 10 software (StatSoft, Inc, Tulsa, Okla, United States). The study was presented to the bioethical committee on-site, and permission was granted to conduct the survey.

Table 2. Gleason Score and PSA Concentration in Donors With CaP

Age	PSA (ng/mL)	Gleason Score
60 y	6.4	4 (2+2)
60 y	7.66	6 (3+3)
64 y	6.08	6 (3+3)
64 y	1.79	6 (3+3)
66 y	3.9	6 (3+3)
68 y	5.71	7 (3+4)

Abbreviations: CaP, prostate carcinoma; PSA, prostate-specific antigen.

RESULTS

The male donors ranged in age from 20 to 68 years (median, 54 years) (Table 1). In the assessed group, 28 patients (53.8%) had PSA levels above laboratory range (4 ng/mL). The median PSA was 4.63 ng/mL (range, 0.33–58 ng/mL). A PSA level ≥10 ng/mL was observed in 8 patients (15.3%). In the group of patients with PSA levels >20 ng/mL (4 donors, 6.9%), the mean age was 39 years (range, 20–55 years). Histologic findings in this group included: 2 cases of high-grade prostatic intraepithelial neoplasia associated with chronic inflammation of the prostate, 1 case of benign prostatic hyperplasia, and 1 case of a normal prostate structure. The pathomorphologic evaluation revealed 6 cases of CaP in the study group (12%). All CaP-confirmed cases were reported in male donors aged >60 years ($P = .00004$). The PSA level ranged from 1.79 to 7.66 ng/mL. Two patients with CaP had PSA levels in the laboratory reference range (0–4 ng/mL); no cancerous morphology was determined in donors with PSA levels >10 ng/mL (Table 2). In every case, neoplastic changes were restricted to the prostate. There was no correlation between histologically confirmed high-grade prostatic intraepithelial neoplasia, CaP, and the PSA level (*P* values, .14 and .51, respectively).

An indwelling catheter is one possible reason for elevations in PSA [6]. In the analyzed group, the median time for catheterization was 4 days (range, 2–19 days). An inverse relationship was found between the PSA level and the

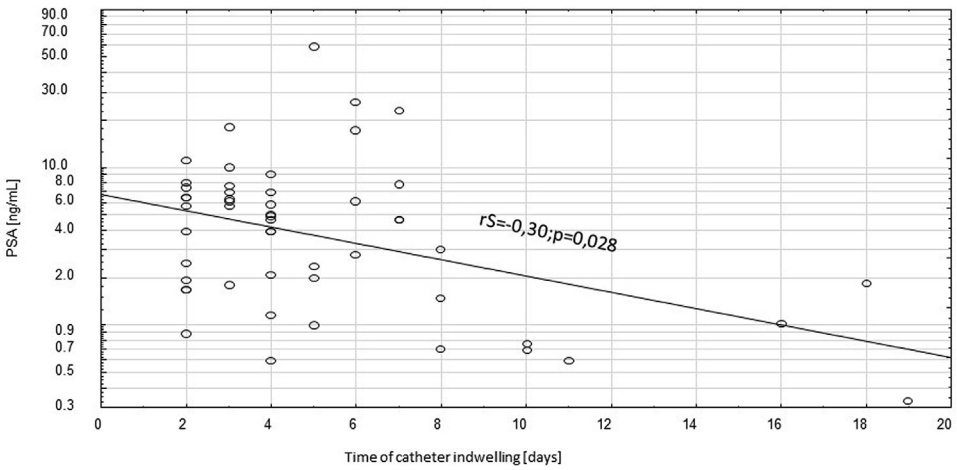

Fig 1. Relationship between prostate-specific antigen (PSA) level and the duration of catheterization.