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Impact of oral immunonutrition on functional outcomes in patients who underwent radical prostatectomy for prostate cancer

Oral immünonütrisyonun prostat kanseri için radikal prostatektomili hastalarda fonksiyonel sonuçlar üzerindeki etkisi

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Abstract

Aim: The effect of oral nutritional support on prostate cancer (PCa), especially the functional outcomes, has been severely questioned. We present the results of a controlled trial to determine the effects of oral nutritional support on functional outcomes after radical prostatectomy.

Methods: This is a prospectively designed, randomized controlled trial to evaluate oncological outcomes in the initial period and functional outcomes in the third and sixth months, but the data were obtained retrospectively. Thirty-six patients who underwent laparoscopic radical prostatectomy performed by a single surgeon between October 2017 and August 2018 were included in the study. Eighteen were started on oral immunonutrition (Oral-Impact, Nestle, 3 × 237 ml per day for seven days at home) in the postoperative period for 6 months and 18 control patients received elemental nutrition support without immune-nutrition components.

Results: There were no significant differences in demographic and baseline characteristics between the groups. There was no wound infection, urinary tract infection, urinary extravasation, hem-o-lock clip migration to bladder, urinoma, or infected lymphocele after surgery in either group. Continence rates at the third and sixth months and potency rates (P=0.630, P=0.37, respectively) six months after radical prostatectomy were similar. Despite the similarity in both continence rates, they were numerically in favor of the study group.

Conclusion: Immunonutrition is associated with early recovery of stress urinary incontinence (SUI) following radical prostatectomy but there was no association between immunonutrition, postoperative morbidity or infectious complications. However, further clinical trials are needed to confirm these promising results.

Keywords: Nutrition, Prostate cancer, Urinary incontinence

Öz

Amaç: Oral beslenme desteğinin prostat kanseri (PK) üzerindeki etkisi, özellikle fonksiyonel sonuçları ciddi şekilde sorgulanmıştır. Oral beslenme desteğinin radikal prostatektomi sonrası fonksiyonel sonuçlar üzerindeki etkisini belirlemek için kontrollü bir çalışmanın sonuçlarını sunuyoruz.

Yöntemler: Bu çalışma erken dönem onkolojik sonuçlarını değerlendirmek ve ayrıca üçüncü ve altıncı aylardaki fonksiyonel sonuçları değerlendirmek için prospektif olarak tasarlanmış olup, veriler geriye dönük olarak elde edilmiş, randomize kontrollü bir çalışmadır. Çalışma için Ekim 2017 ile Ağustos 2018 tarihleri arasında tek bir cerrah tarafından laparoskopik radikal prostatektomi yapılan 36 hasta değerlendirildi. Onsekiz hastaya postoperatif dönemde 6 ay boyunca oral immünonütrisyon (Oral-Impact, Nestle, 7 gün evde 3 × 237 ml) başladı ve 18 kontrol hastasına immün beslenme bileşenleri olmayan elemental beslenme desteği verildi.

Bulgular: Gruplar arasında demografik ve başlangıç özellikleri açısından önemli bir farklılık yoktu. Her iki grupta da ameliyat sonrası yara enfeksiyonu, idrar yolu enfeksiyonu, üriner ekstravazasyon, hem-o-kilit klipsinin mesaneye göçü, ürinom veya enfekte lenfosel görülmedi. Radikal prostatektomiden altı ay sonra kontinans oranları ve potens oranları (sırasıyla P=0,630, P=0,37) benzerdi. Radikal prostatektomiden üç ay sonra kontinans oranları benzer olmasına rağmen, her ikisi de sayısal olarak çalışma grubu lehine idi.

Sonuç: İmmünonütrisyon, radikal prostatektomi sonrası stres üriner inkontinansın (SUI) erken iyileşmesi ile ilişkilidir, ancak immünonütrisyon ve postoperatif morbidite arasında ne enfeksiyöz komplikasyonlar üzerinde bir ilişki yoktur. Bununla birlikte, bu umut verici sonuçları doğrulamak için daha fazla klinik araştırmaya ihtiyaç vardır.

Anahtar kelimeler: Beslenme, Prostat kanseri, İdrar kaçırma

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Introduction

Despite recent advancements in minimally invasive surgical technique, post-radical prostatectomy stress urinary incontinence (SUI), which is one of the most common and significant complications of radical prostatectomies (RP) as it strongly reduces quality of life in RP patients, is much more common. Prostate cancer databases suggest that following RP, 1% to 40% of patients complain of persistent urinary incontinence (UI) [1-5]. Recently, there have been reports that nutritional support affects postoperative infectious complications by the intake of oral nutrient preparations which enhance immune functions, such as ω-3 fatty acids, arginine, and nucleic acid [6-9]. Inflammatory mediators that have anti-inflammatory effects such as prostaglandin (PG) E3, thromboxane (TX) A2, and leukotriene (LT) 5 are derived from ω-3 fatty acids. Taking oral nutritional preparations containing prominent levels of ω-3 fatty acids could control postoperative inflammation, immunosuppression, and infections [10]. Patients receiving oral nutrient preparations had lower complication rates and shorter hospital stay lengths compared to patients receiving standard enteral diets. However, none of these studies considered the functional outcomes in prostate cancer patients. Immunonutrition after radical prostatectomy is not as prevalent as before surgeries of the esophagus, colon, and other parts of the digestive tract. However, functional outcomes after radical prostatectomy, including complications such as SUI and erectile dysfunction, may be worse. It is hypothesized that oral immunonutrition has a significant role in tissue recovery and may contribute to faster recovery of urethral sphincter structure, hence, it could be started after radical prostatectomy.

We aimed to establish whether supplying peri-operative and post-operative oral immunonutrition for prostate cancer patients undergoing radical prostatectomy was associated with reduced rates of postoperative complications and superior functional outcomes.

Materials and methods

This pilot study was designed prospectively, but the data of thirty-six patients who underwent radical prostatectomy performed by a single surgeon at the Department of Urology, Pamukkale University, between 2017 and August 2018 were collected retrospectively. All patients signed an informed consent form after the approval of the study by the Research Ethics Committee of Pamukkale University Hospital (File number: 60116787-020/53607). Thirty-six consecutive patients who underwent radical prostatectomy within six months were enrolled into the immunonutrition and control groups (n=18 in each group). The patients in the study group received Impact ® (Nestle Health Science) on the first day of surgery, up until the sixth postoperative month. Control group received elemental nutrition support without immune-nutrition components. Before the surgery, both the surgeon and the nutrition team including dietitians evaluated all patients. Demographic characteristics, clinical outcomes and functional outcomes including potency and continence rates in the third and sixth postoperative months were recorded.

Inclusion and exclusion criteria

We included patients who underwent laparoscopic radical prostatectomy for prostate cancer by a single surgeon. Patients were excluded if they had renal dysfunction (Ccr <30 ml/min), required insulin injection, were unable to take oral nutrition, had an American Society of Anesthesiologists (ASA) score >2, or severe malnutrition (loss >5% in 1 month, NRS score ≥3). We also excluded patients with a follow-up of less than 6 months and those who did not complete the immunonutrition protocol during the follow-up period.

Nutrition therapy

The patients in the study group received Impact ® (Nestle Health Science) formulation as it contains omega-3 fatty acids, arginine, nucleotides, minerals, and medium chain triglycerides up until six months after the first day of surgery per day, as recommended by various studies and the national (DGEM) and international (ESPEN) guidelines [11-13].

Statistical analysis

Kruskall–Wallis and independent samples T tests were used to compare the groups to evaluate the patient characteristics. The medians and the proportions of variables were compared. The $\chi 2$ test was used to analyze categorical variables. $P<0.05$ was considered statistically significant. The data was tested for normality of distribution. All statistical analyses were performed using SPSS version 22.0 (IBM Inc., Armonk, NY, USA).

Results

Table 1 shows the demographic and clinical characteristics of the two groups. No significant differences were found between the groups in terms of age, BMI, ASA score, nerve sparing rate, or pathological stage ($P=0.086$, $P=0.659$, $P=0.215$, $P=0.106$ and $P=0.310$, respectively). There was no wound infection, urinary tract infection, urinary extravasation, hem-o-lock clip migration to bladder, urinoma, or infected lymphocele after surgery in either group.

Table 1: Population characteristics of the two groups of patients

	Study group (Oral Impact®)	Control group	*P*-value
Age (years)	63.28 (7.43)	67.44 (6.70)	0.086
BMI	28.45 (4.07)	29.28 (6.83)	0.659
ASA	1.94 (0.540)	2.17 (0.514)	0.215
PSA ng/mL	9.94 (7.74)	10.98 (7.78)	0.692
Gleason grade			
≤6	1 (67%)	8 (44%)	0.403
7	4 (22%)	7 (39%)	
>7	2 (11%)	3 (17%)	
Pathologic stage			
pT2	6 (33%)	9 (50%)	0.310
pT3	12 (67%)	9 (50%)	
Nerve Sparing			
None	9 (50%)	14 (78%)	0.106
Unilateral	3 (17%)	0	
Bilateral	6 (33%)	4 (22%)	
Positive Surgical Margins	5 (28%)	5 (28%)	0.644
Lymph node			
Nx	9 (50%)	9 (50%)	
N0	9 (50%)	9 (50%)	
Transfusion rate	6 (33%)	1 (6%)	
Blood loss (ml)	209.44 (135.88)	170.56 (42.39)	0.254
Hospital stay (days)	4.84 (0.9)	5.33 (1.65)	0.322
Operative time (minutes)	176.83 (46.55)	179 (44.81)	0.888
Blood loss (ml)	1.66 (0.88)	1.05 (1.29)	0.105
Drainage time (days)	2.22 (0.43)	2.33 (0.49)	0.471
Duration of catheterization (days)	9.56 (1.86)	9.17 (1.1)	0.449

ASA: American Society of Anesthesiologists. BMI: Body Mass Index. PSA: Prostate-specific antigen

Table 2 shows functional and oncological outcomes. Continence rates at three and six months, along with potency rates (22% versus 11%, $P=0.371$) six months after radical

prostatectomy were similar; however, both continence rates were numerically in favor of the study group.

Table 2: Functional outcomes

	Study group (Oral Impact®)	Control Group	*P*-value
Continence rates at six months	9 (50%)	9 (50%)	0.630
Continence rates at three months	9 (50%)	5 (72%)	0.171
Potency rates at six months	4 (22%)	2 (11%)	0.371
Follow up time	12.33 (3.48)	14.17 (1.76)	0.054
PSA recurrence	0	1 (0.6)	0.5

PSA: Prostate-specific antigen

Discussion

To the best of our knowledge, this is a rare study evaluating the efficacy of immunonutrition in preventing postoperative complications and reducing incontinence after radical prostatectomy.

It is known that malnutrition is a clinical condition of multifactorial etiologies that affects surgical site infections and mortality in the postoperative period. Immunonutrition was first described to stimulate gut immune system, protecting against enteropathogen infections [14].

Senkal et al. [15] showed that immunonutrition reduced the rate of postoperative infections and wound complications. They also reported that the immunonutrition group was more cost-effective than the control group.

Evoy et al. [16] reported that arginine reduced severe sepsis, postoperative stress, and rate of postoperative infections. Bertrand et al. [17] reported that global morbidity was significantly less in patients who received immunonutrition (P=0.008); and preoperative immunonutrition before cystectomy reduced postoperative infections (P=0.008) along with paralytic ileus (0.02). Gregg et al. reported that malnourishment before cystectomy leads to higher mortality [18].

Cerantola et al. [19] showed that higher nutritional risk score in patients after major urological surgery leads to more complications. Jill et al. [20] showed that patients who received preoperative immunonutrition had lower complication rates after radical cystectomy (RC). Major abdominal surgeries induce general inflammation in all tissues.

Immunonutrition leads to better wound healing. We aimed to evaluate the effect of immunonutrition on the urethral sphincter after radical prostatectomy and whether incontinence can be reversed earlier, based on this hypothesis. The study group had reduced rates of incontinence numerically but not statically due to the small number of patients in each group. If the number of study patients was greater, grander effects regarding incontinence rate could be expected.

Limitations

This study had several limitations, first one being its retrospective nature, and the second being the small number of patients. Also, no propensity score matching was done.

Conclusion

The present findings show that immunonutrition taken postoperatively may reduce incontinence but prospective and randomized trials with more patients are needed.

References

1. Hu JC, Elkin EP, Pasta DJ, Lubeck DP, Kattan MW, Carroll PR Predicting quality of life after radical prostatectomy: results from CaPSURE. The Journal of urology. 2004;171(2):703-8.
2. Rodriguez Jr E, Skarecky DW, Ahlering TE, Post-robotic prostatectomy urinary continence: Characterization of perfect continence versus occasional dribbling in pad-free men. Urology. 2006;67:785-8.
3. Krupski TL, Saigal CS, Litwin MS. Variation in continence and potency by definition. J Urol. 2003;170:1291-94.
4. Olsson LE, Salomon L, Nadu A, Hoznek A, Cicco A, Saint F, et al. Prospective patient-reported continence after laparoscopic radical prostatectomy. Urology. 2001;58:570-2.
5. Penson DF, McLerran D, Feng Z, Li L, Albertsen PC, Gilliland FD, et al. 5-year urinary and sexual outcomes after radical prostatectomy: Results from the prostate cancer outcomes study. J Urol. 2005;173:1701-05.
6. Muzii VF, Bistazzoni S, Zalaffi A, Carangelo B, Mariottini A. Chronic subdural hematoma: comparison of two surgical techniques. J Neurosurg. 2005;49:41-7.
7. Zakaraia AM, Adnan JS, Haspani MSM, Naing NN, Abdullah JM. Outcome of 2 different types of operative techniques practiced for chronic subdural hematoma in Malaysia: an analysis. Surg Neurol. 2008;69:608-16.
8. Ernestus RI, Beldzinski P, Lanfermann H, Klug N. Chronic subdural hematoma: Surgical treatment and outcome in 104 patients. Surg Neurol. 1997;48:220-5.
9. Tsutsumi K, Maeda K, Iijima A, Usui M, Okada Y, Kirino T, et al. The relationship of preoperative magnetic resonance imaging findings and closed system drainage in the recurrence of chronic subdural hematoma. J Neurosurg. 1997;87:870- 5.
10. Teasdale GM, Pettigrew LE, Wilson JT, Murray G, Jannett B. Analyzing outcome of treatment of severe head injury: a review and update on advancing the use of the Glasgow Outcome Scale. J Neurotrauma. 1988;15:587-97.
11. Marik PE, Zaloga GP. Immunonutrition in high-risk surgical patients: a systematic review and analysis of the literature. JPEN J Parenter Enter Nutr. 2010;34(4):378–86.
12. Weimann A, Braga M, Harsanyi L, Laviano A, Ljungqvist O, Soeters P. et_al. ESPEN guidelines on enteral nutrition: surgery including organ transplantation. Clin Nutr. 2006;25(2):224–44.
13. Weimann A, Ebener C, Hausser L, Holland−Cunz S, Jauch KW, et al. Leitlinie parenterale ernährung der DGEM: Chirurgie und transplantation. Aktuel Ernaehr Med. 2007;32:114–23.
14. McClave SA, Lowen CC, Snider HL. Immunonutrition and enteral hyperalimentation of critically ill patients. Dig Dis Sci. 1992;37(8):1153-61.
15. Senkal M, Mumme A, Eickhoff U, Geier B, Spa¨th G, Wulfert D, et al. Early postoperative enteral immunonutrition: clinical outcome and cost-comparison analysis in surgical patients. Crit Care Med. 1997;25(9):1489-96.
16. Evoy D, Lieberman MD, Fahey TJ III, Daly JM. Immunonutrition: the role of arginine. Nutrition. 1998;14(7–8):611–7.
17. Bertrand J, Siegler N, Murez T, Poinas G, Segui B, Ayuso D, et al. Impact of preoperative immunonutrition on morbidity following cystectomy for bladder cancer: a case–control pilot study. World J Urol. 2014;32:233-7.
18. Gregg JR, Cookson MS, Phillips S, Salem S, Chang SS, Clark PE, et al. Effect of preoperative nutritional deficiency on mortality after radical cystectomy for bladder cancer. J Urol. 2011;185(1):90-6.
19. Cerantola Y, Valerio M, Hubner M, Iglesias K, Vaucher L, Jichlinski P. Are patients at nutritional risk more prone to complications after major urological surgery? J Urol. 2012;190(6):2126-32.
20. Hamilton-Reeves JM, Stanley A, Bechtel MD, Yankee TM, Chalise P, Hand LK, et al. Perioperative Immunonutrition Modulates Inflammatory Response after Radical Cystectomy: Results of a Pilot Randomized Controlled Clinical Trial, The Journal of Urology. 2018;200(2):292-301.

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