

## ORIGINAL PAPER

# Impact of Complications and Bladder Cancer Stage on Quality of Life in Patients with Different Types of Urinary Diversions

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**Goal:** Determine correlation between complications and stage of the disease and their impact on quality of life in patients with different types of ileal urinary derivation after radical cystectomy, and upon estimation of acquired results, to suggest the most acceptable type of urinary diversion. **Patients and methods:** In five year period a prospective clinical study was performed on 106 patients, to whom a radical cystectomy was performed due to bladder cancer. Patients were divided into two groups, 66 patients with ileal conduit derivation and 40 patients with orthotopic derivation, whereby in each group a comparison between reflux and anti-reflux technique of orthotopic bladder was made. All patients from both groups filled the Sickness Impact Profile score six months after the operation. All patients had CT urography or Intravenous urography performed, as well as standard laboratory, vitamin B12 blood values, in order to evaluate early (ileus or subileus, wound dehiscence, bladder fistula, rupture of orthotopic bladder, urine extravazation) and late complications (VUR, urethral stricture, ureter stenosis, metabolic acidosis, mineral dis-balance, hypovitaminosis of vitamin B12, increased resorption of bone calcium, urinary infection, kidney damage, relapse of primary disease), so as disease stage and it's impact on quality of life. **Results:** From gained results we observe that each category of SIP score correlates with different rate of correlation with the type of operation, group, T, N, and R grade, except work category. Average value of SIP score rises depending on the type of operation and T stage. It is notable that there is no difference in T1 stage, no matter the type of operation. So the average value of SIP score in T1 stage for conduit was 20.3, for Abol-Enein and Ghoneim 17.25 and Hautmann 18.75 respectively. Average value of SIP score in T2 stage for conduit was 31, for Abol-Enein and Ghoneim 19.1 and Hautmann 17.8. Average value of SIP score in T3 stage for conduit was 38.03, for Abol-Enein and Ghoneim 18.75 and Hautmann 19.5. SIP score for T4 was present only in patients with conduit performed and average value of SIP score was 40.42. There is a high level of correlation of late complications and psychosocial and physical dimension with their parameters, while for an independent dimension of correlation is not significant. Early complications have insignificant correlation in all categories of SIP score. **Conclusion:** Upon analyzing quality of life and morbidity, significant advantage is given to orthotopic derivations, especially Hautmann derivation with Chimney modification, unless there are no absolute contraindications for performing this type of operation. Factors which mostly influence quality of life are cancer stage, type of derivation, late complications and patient age. SIP score, as a well validated questionnaire, are applicable in this kind of research. **Key words:** QOL, SIP score, radical cystectomy, complications, stage.

over twenty years and now numerous authorities agree that measuring quality of life is the key measuring in clinical research. The main problem in all researchers within this field is the lack of universal accordance upon definition of the quality of life term. The WHO concept defines the quality of life of an individual as an individual perception of their position in life in the context of the culture and assessment of the system in which they live and in relations towards their goals, expectation, standards and worries. It's generally leveled concept deeply influenced by physical health of the person, his psychological status, the level of independence, social relations and their relation towards main characteristics of their environment (1). Quality of life describes and measures influence of different conditions of everyday life and activities, taking into consideration emotional and social functions, as well as purely physical (2). Radical cystectomy implies simultaneous surgery of urinary tract, digestive tract and lymph nodes, therefore complications occur often upon such extensive surgical treatment. In accordance with current literature, incidence of this secondary condition varies a lot (19%-64%) (3, 4), most likely because of very different definitions of morbidity. Current literature is not consistent regarding assessing quality of life of cutaneous forms of urinary derivation com-

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## 1. INTRODUCTION

Although the post-operative morbidity analysis is simple for evaluation,

the measuring of the quality of life still represents an issue. Quality of life has been a subject of medical research for

pared to continent forms. The problem is in the fact that this kind of disorders influencing the quality of life there are no specific instruments which would quantify and objectify the level of disorder of quality of life.

Furthermore, is the quality of life influenced uniquely by the type of derivation or by other factors as well? In the lack of specific questionnaire on quality of life for urinary derivation after radical cystectomy, we mostly use general questionnaires, such as Sickness Impact Profile (SIP score).

SIP score represents one of the most comprehensive instruments for assessing quality of life, and it's function is to show quality of life disorder through behavior disorder of the patient, as a consequence of the disease or therapy (5).

## 2. MATERIAL AND METHODS

In this prospective study, 106 patients were evaluated who were suffering from invasive bladder cancer, and were divided in two groups. In both groups all patients had transitional cell cancer (TCC) and no distant metastases were found or local recurrence.

**Group A:** This group consisted of 40 patients with orthotopic derivation, 20 patients with Hautmann derivation and Chimney modification of ureterointestinal anastomosis, and in other 20 patients a supravescical derivation by Ghoneim was performed. In both types of orthotopic derivation 40 cm of terminal ileum was used. In early postoperative period, early postoperative complications were followed: ileus or subileus, wound dehiscence, bladder fistula, rupture of orthotopic bladder, urine leak. Six months after surgery, a control evaluation was performed, and all patients from these groups have filled the SIP score in order to assess and grade quality of life, so the following laboratory tests were performed: minerals, urea, creatinine, ABS status, blood count, vitamin B-12 and alkaline phosphatase and urine culture. We also determined the level of residual urine for these patients using ultrasound, and we also performed a CT urography and cystoscopy in order to verify eventual late postoperative complications: vesico-ureteral reflux, urethral stricture, ure-

ter stenosis, metabolic acidosis, mineral disbalance, hypovitaminosis of vitamin B12, increased re-absorption of bone calcium, urinary infection, kidney damage or recurrence of primary disease. We also gained data related to incontinence and erectile dysfunction.

**Group B:** This group consisted of 66 patients to whom after radical cystectomy, ileal conduit derivation was per-

formed. In early postoperative stage in this group early postoperative complications were followed: ileus or subileus, wound dehiscence. Six months after operational treatment, a control study was conducted and all patients from this group filled the SIP score in order to assess and grade quality of life, so the following laboratory tests were performed: minerals, urea, creatinine, ABS

Correlations coefficients SIP score according to group, operation, T and G stage							
		Skupina	Tip operacije	T stadij	N stadij	R stadij	Gradus
Sum %	Ro	.816**	-.790**	.750**	.433**	.349**	-.359**
	P	.000	.000	.000	.000	.000	.000
	N	106	106	106	106	106	106
Body care and movement	Ro	.825**	-.809**	.737**	.497**	.329**	-.359**
	P	.000	.000	.000	.000	.001	.000
	N	106	106	106	106	106	106
Mobility	Ro	.10**	-.793**	.754**	.435**	.319**	-.324**
	P	.000	.000	.000	.000	.001	.001
	N	106	106	106	106	106	106
Ambulation	Ro	.820**	-.799**	.771**	.387**	.306**	-.355**
	P	.000	.000	.000	.000	.001	.000
	N	106	106	106	106	106	106
Physical dimension	Ro	.821**	-.800**	.789**	.459**	.291**	-.335**
	P	.000	.000	.000	.000	.002	.000
	N	106	106	106	106	106	106
Sleep and rest	Ro	.434**	-.413**	.690**	.430**	.282**	-.374**
	P	.000	.000	.000	.000	.003	.000
	N	106	106	106	106	106	106
Home management	Ro	.695**	-.676**	.755**	.449**	.308**	-.361**
	P	.000	.000	.000	.000	.001	.000
	N	106	106	106	106	106	106
Work	Ro	.701**	-.691**	.389**	.293**	.221**	-.328**
	P	.000	.000	.000	.002	.023	.001
	N	106	106	106	106	106	106
Recreation	Ro	.321**	-.314**	.736**	.399**	.255**	-.222**
	P	.001	.001	.000	.000	.008	.022
	N	106	106	106	106	106	106
Eating	Ro	.428**	-.412**	.585**	.367**	.312**	-.327**
	P	.000	.000	.000	.000	.001	.001
	N	106	106	106	106	106	106
Independent dimension	Ro	.663**	-.650**	.766**	.502**	.302**	-.385**
	P	.000	.000	.000	.000	.002	.000
	N	106	106	106	106	106	106
Emotional behavior	Ro	.757**	-.743**	.747**	.513**	.333**	-.265**
	P	.000	.000	.000	.000	.000	.006
	N	106	106	106	106	106	106
Alterness behavior	Ro	.746**	-.720**	.781**	.443**	.404**	-.306**
	P	.000	.000	.000	.000	.000	.001
	N	106	106	106	106	106	106
Social interaction	Ro	.774**	-.767**	.714**	.423**	.386**	-.304**
	P	.000	.000	.000	.000	.000	.002
	N	106	106	106	106	106	106
Communication	Ro	.804**	-.778**	.802**	.436**	.364**	-.339**
	P	.000	.000	.000	.000	.000	.000
	N	106	106	106	106	106	106
Psychosocial dimension	Ro	.769**	-.748**	.788**	.452**	.390**	-.286**
	P	.000	.000	.000	.000	.000	.003
	N	106	106	106	106	106	106

Table 1. Correlations of all categories of SIP score by group, operation or disease stage.

status, blood count, vitamin B-12 and alkaline phosphatase and urine culture. We also performed intravenous urography or CT urography or MR urography, and by physical examination or by anamnesis data, we determined eventual complications related to ileostomy. All these examinations were performed in order to verify eventual late postoperative complications: vesicoureteral reflux, ureter stenosis, metabolic acidosis, mineral disbalance, hypovitaminosis of vitamin B12, increased reabsorption of bone calcium, urinary and stomal infection, asymptomatic bacteriuria, kidney damage, functional or cutaneous complications with ileostomy or recurrence of primary disease.

### 3. RESULTS

This is a tabular overview of all SIP parameters by type of operation, examined group and stage and grade of disease. Here we should notice that group 1 represents orthotopic derivation and group 2 derivation with ileal conduit. It is notable that each category of SIP score correlates with different rate of correlation, group, T, N, R and grade. Except the category work.

In the upper table it is notable that there is a high level of correlation of late complications and psychosocial and physical dimension with their parameters, while in independent dimension correlation is not significant. Early complications have not significant correlation with all categories of SIP score.

Average value of SIP score rises depending on the type of operation and T stage. It is notable that there are no differences in T1 stage, no matter the operation. So the average SIP score value in T1 stage for conduit was 20,3, for Abol-Enein and Ghoneim 17,25 and Hautmann 18,75. Average value of SIP score in T2 stage for conduit 31, for Abol-Enein and Ghoneim 19,1 and Hautmann 17,8, Average value in SIP score T3 stage for conduit was 38,03, for Abol-Enein and Ghoneim 18,75 and Hautmann 19,5. SIP score for T4 stage was present only in patients with conduit performed and average value of SIP score being 40,42.

Upper table represents that patient who had ileal conduit performed who will have higher percentage of disability

compared to patient with Gonheim or Hautmann. The same goes for grade, meaning that patient with HG will have higher score of disability compared to patients with LG, patients with higher T stage higher rate of disability. Last statistically significant variable or factor which influences quality of life is late complications for all three types of derivations (their number) which means that patients with more complications will have higher disability. So, the regression analysis is showing that the T stage is the most influential regarding the change of quality of life (decrease/disability or however is labeled), followed by the type of operation, tumor grade and late complications are characteristic for all three types of operational procedures. Other variables show certain influence but of no significant importance.

### 4. DISCUSSION

Radical cystectomy with lymphadenectomy represents the only secure way of treating organ limited invasive bladder cancer, which allows not only tumor control, but also enable a positive functional result, especially regarding urinary derivation. During past several decades different types of urinary derivations have been developed. They are divided in three basic forms: conduit diversions, usually ileal conduit, orthotopic neobladders and pouches, which could be catheterized. The purpose of urinary diversions upon cystectomy have improved from simple diversion and protection of upper urinary tract to functional and anatomic restoration of lower urinary tract, by imitating as much as possible preoperative condition. Main purpose of urinary derivation is to be

Correlations coefficients complications according to SIP score			
		Late complication	Early complication
Sum %	Ro	.649**	.465**
	p	.000	.000
	N	106	106
Body care and movement	Ro	.686**	.424**
	p	.000	.000
	N	106	106
Mobility	Ro	.677**	.526**
	p	.000	.000
	N	106	106
Ambulation	Ro	.627**	.464**
	p	.000	.000
	N	106	106
Physical dimension	Ro	.660**	.508**
	p	.000	.000
	N	106	106
Sleep and rest	Ro	.456**	.445**
	p	.000	.000
	N	106	106
Home management	Ro	.577**	.363**
	p	.000	.000
	N	106	106
Work	Ro	.424**	.192*
	p	.000	.049
	N	106	106
Recreation	Ro	.470**	.514**
	p	.000	.000
	N	106	106
Eating	Ro	.385**	.402**
	p	.000	.000
	N	106	106
Independent dimension	Ro	.548**	.429**
	p	.000	.000
	N	106	106
Emotional behavior	Ro	.555**	.409**
	p	.000	.000
	N	106	106
Social interaction	Ro	.601**	.475**
	p	.000	.000
	N	106	106
Alterness behavior	Ro	.649**	.458**
	p	.000	.000
	N	106	106
Communication	Ro	.647**	.496**
	p	.000	.000
	N	106	106
Psychosocial dimension	Ro	.617**	.480**
	p	.000	.000
	N	106	106

Table 2. Correlations of SIP score with overall early and late complications. \*\*. Correlation significant on level p<0,01 \* . Correlation significant on level p<0,05

the safest in tumor control, has minimal complications in early and late postoperative period and to be adaptable to patient's life habits, in order to ensure best quality of life (6).

Using evidence based on current medical literature related to quality

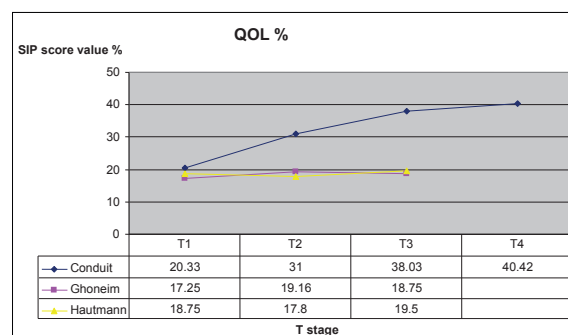
Model	Coefficients						
	Non standardized coefficients		Standardized coefficients	t	p	95.0% CI for B	
	B	SE	Beta			Min	Max
(Constant)	27.839	4.406		6.318	.000	19.092	36.585
T stage	1.851	0.274	0.508	6.759	0	1.307	2.395
Operation	-5.157	0.676	-0.438	-7.627	0	-6.499	-3.815
Age	4.891	.835	.498	5.859	.000	8.811	19.198
Grade	-2.461	1.196	-0.095	-2.058	0.042	-4.835	-0.087
Late complication	1.454	0.664	-0.148	-2.19	0.033	-2.772	-0.136
Early complication	-1.135	0.603	0.108	1.884	0.061	-0.061	2.332
N stage	0.897	0.579	0.077	1.548	0.125	-0.253	2.047
Late complication Bricker	0.442	1.119	0.021	0.395	0.044	-1.78	2.664
R stage	0.435	1.375	0.016	0.317	0.752	-2.295	3.165
Sex	0.401	1.009	0.018	0.397	0.692	-1.602	2.404
Late complication Hautmann and Ghoneim	-0.007	0.007	-0.048	-1.002	0.319	-0.02	0.007

a. Dependent variable: Sum %

Table 3. Results of multivariate regression of SIP score

of life, authors cannot state with certainty that patients with continent forms of derivation have better quality of life. Porter and Penson in 2005 performed a systematic examination (meta-analysis) of literature regarding quality of life. They used MEDLINE as data source and searched for all articles regarding quality of life published in 1996-2004 period. Inclusive criteria was that patient was a grownup, suffering from bladder cancer, comparative studies, original examination, primary study of outcome related to quality of life, using a good and validated questionnaire of quality of life. Only studies which were comparing neobladder, continent reservoirs or conduit diversions were included. Authors concluded that current literature was not sufficient to deduct which type of urinary derivation provides better outcome regarding quality of life. (7).

Sickness Impact Profile (SIP) score which was used in this study to evaluate patient's health condition with different types of urine derivation (ileal conduit and orthotopic continent bladder), is designed to measure the level of dysfunction of behavior related to disease and disease impact on patient's behavior and to reflect subjective perception of possibilities to perform certain activities. By using this questionnaire, we can evaluate physical, social and mental status of patient in everyday life, to evaluate results of different type of treatments and to measure progress of



Graph 1. Values of total SIP score by operation and T stage

patient in longitudinal studies for specific disease categories and/or disability as a consequence of different diseases, traumas and treatments.

Upon searching for correlations, using Spearman correlation index, we observed that there is a correlation between SIP score and all patients form examined groups, with disease stage, N and R stage and grade, that there is a correlation of late complications and psychosocial and physical dimension with their parameters, while for independent dimension correlation was not significant. Early complications have no significant correlations with all categories of SIP score. If we divide types of derivation, we observe that there are significant positive and negative correlations of all categories of SIP score with late complications in ileal conduit group, while there is no correlation between early complication and orthotopic derivation group.

By using multi-variant regression analysis it is proven that T stage, group of operation and age have high level of influence on general quality of life, while grade and early complications

influence is not significant. Other parameters like late complications of orthotopic derivation, N stage, R stage and gender do not have any influence on quality of life.

Although all these facts speak in favor of choosing orthotopic bladder as method of choice, we should also take into consideration that patients with ileal conduit are ten years older with all of their comorbidity, that most of them suffered from advanced disease (T3 and T4 and positive lymph nodes) or higher values of creatinine and urethral invasion were contra indications for continent bladder. Nonetheless, higher morbidity due to primary disease, 6 months upon surgery, was not or only partially manifest. In this study, we noticed that quality of life rises proportionally to disease stage, so patients with T1 tumor in both groups have almost the same percentage of quality of life (18% v.s. 20%). The reason lies in the fact that the chance for advancing disease with all of its complications influences significantly quality of life no matter the derivation, which could be proved by using HRQOL questionnaire which covers all aspects of life. This specimen is very small to draw any conclusions, but it could be a good base for further research, especially because all statistical researches in this field point the fact that it all starts without disease stage. It is necessary to point out that this study covers patients aging from 38 to 82, and that there is a significant difference in quality of life estimation. It is caused by the fact that there could be significant differences in categories such as work, social interaction (question of decreased sexual function was elaborated) and recreation between examined groups. Although, in this study, in none patient a local recurrence of disease was verified 6 months upon surgery, it is obvious that T stage influences significantly quality of life. Accordingly, SIP questionnaire with its results in assessing overall quality of life, could be used as a predictor for a doctor for minimal changes, such as pain or micro metastasis, which could not be discovered by using radiology or biochemistry procedures, but deteriorate basic physiological processes, which reflect subsequently as an impaired quality of

life. In such cases, frequent check-ups or well-timed treatments would be a relief to the patient, but in the same time, will give the family a chance to prepare and accept the facts.

In the end, we could say that SIP score represents an optimal instrument of evaluation in patients with ileal urinary derivation performed upon radical cystectomy. Due to lack of quality of life questionnaire for urinary derivations, being well validated also, SIP score as a general questionnaire on impact of disease on quality of life represents a good alternative for a targeted questionnaire for urine derivation. Eventual new questionnaire should also include a disease stage as one of necessary parameters which should be evaluated. Having in mind that the patient's condition is a dynamic process, which depends on experience and habits, accurate results of quality of life should be acquired one year or more after surgery, in order to determine with certainty which type of derivation is less troublesome for patient.

## 5. CONCLUSION

By using SIP score it has been proven that T stage, group of operation, late complication in ileal conduit and age have high level of influence to overall quality of life, while early complications influence is not significant. Other parameters like late complications of orthotopic derivations, N stage, R stage and gender do not influence quality of life at all. Quality of life rises proportionally with disease stage, so patients with T1 stage of tumor in both groups have practically the same percentage of quality of life (18% v. s. 20%). As a result of this research, a question of T stage of disease importance as a parameter is raised in relation to type of urinary derivation, for the purpose of determining quality of life. Still, this specimen is not sufficient to acquire relevant answers, but can be good basis for further researches.

**CONFLICT OF INTEREST: NONE DECLARED**

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