



# Effect of Betadine on Lymphocele Formation During Kidney Transplantation Surgery

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## Abstract

**Background:** Lymphocele formation post-renal transplantation surgery can cause various complications such as pelvic pain, frequent urination, hydronephrosis, deep vein thrombosis, etc. It is, therefore, necessary to prevent and treat lymphocele.

**Objectives:** This study aimed to evaluate the effect of rinsing the surgical site with betadine (povidone-iodine 2%) on the prevention of lymphocele formation during kidney transplantation surgery.

**Methods:** This case-control study was conducted at Tehran University of Medical Sciences in 2019. The study population consisted of 60 kidney transplant patients referred to Sina Hospital, located in Tehran, who were randomized into two groups of study and control by simple randomization using a computer-generated random list. The surgical site of one group (control group: 30 patients) was washed with povidone-iodine 2%, but this operation was not performed for the patients of the other group (control group: 30 patients). One month after the surgery, patients were monitored for lymphocele via ultrasound, and their sera's creatinine level was measured to assess renal function. For all statistical interpretations,  $P < 0.05$  value was accepted as being significant. Statistical analyses were performed with statistical software package SPSS version 23.

**Results:** Results: The mean serum creatinine level of patients in the case group was  $2.50 \pm 1.78$ , and in the control group was  $2.31 \pm 1.89$ . Ultrasound performed one-month post-renal transplant showed the presence of lymphocele in 17 patients out of the total 30 in the study group, while the control group had only 12.

**Conclusions:** It seems that the use of betadine during kidney transplant surgery does not prevent the formation of lymphocele after the surgery

**Keywords:** Povidone-Iodine, Kidney Transplantation, Lymphocele

## 1. Background

Lymphocytes are a common complication of kidney transplant surgery (1). Lymphocytes are collections of lymphatic fluid surrounded by a fibrotic wall without epithelial cells (2-6). The incidence of lymphatic collections after kidney transplantation has been reported to be 0.8 to 49% in various studies (7, 8). Most of these collections are created in the first three months of transplantation (9). The treatment for lymphocytosis is to open it into the peritoneal cavity (2). Studies also show that sclerotherapy and the use of betadine can play an effective role in the early recovery and the prevention of lymphocele development (10, 11).

Betadine is an antiseptic solution used to disinfect the

skin before and after surgery. This substance kills a wide range of microorganisms by releasing iodine (12). So far, various studies have investigated the effect of betadine (povidone-iodine) on the prevention or treatment of lymphocele after kidney transplantation. A study was performed to evaluate the effect of injecting betadine using an ultrasound guide and its effect on the treatment of lymphocele by Damiano and his colleagues. It showed the elimination of lymphoceles in all participating patients, and they witnessed an improvement in their kidney function (10).

A study conducted in Turkey by Bozkurt and his colleagues also showed that drainage and betadine administration in patients with lymphocele formation after kidney

transplant surgery would cause lymphocele to disappear and not to recur within the next three months (13). Another study by Bohloli and his colleagues showed that the use of betadine for the treatment of lymphocele after kidney transplantation is safe and effective; thus, it can be considered the first choice of treatment for lymphocele (1). Accordingly, we decided to perform this study due to the fact that lymphoceles can cause various complications such as pelvic pain, frequent urination, hydronephrosis, deep vein thrombosis, etc. (14, 15). Furthermore, this study was performed because of the fact that so far in Iran, there are only a few studies regarding the use of betadine in the prevention or treatment of lymphocele development after kidney transplant surgery.

## 2. Objectives

This study aimed to evaluate the effect of rinsing the surgical site with betadine (povidone-iodine 2%) on the prevention of lymphocele formation during kidney transplant surgery.

## 3. Methods

The present study was a case-control study that took place at the Tehran University of Medical Sciences in 2019. The study comprised of 70 individuals that approached Sina hospital. Written and oral consent were obtained from all participants before the study. Of the 70 participants, 9 individuals had abnormal thyroid results, and one non-compliant individual in need of follow up via sonogram for lymphocele were excluded, leaving the 60 remaining candidates for renal transplantation to be used in this study. The study population was divided into two groups of 30 individuals, including the case patients and the control subjects. In order to dilute the Betadine, 5cc of 10% betadine was diluted in 95cc of normal saline to be used as the surgical disinfectant in the control group. In the control group, the retroperitoneal surgical site was cleaned with diluted betadine, whereas the case patients underwent the normal protocol for retroperitoneal cleaning in renal transplantation. The fact should be taken into consideration that the guidelines for renal transplant do not mandate betadine usage as pre-surgical preparation. In order to follow up the patients for post-surgical development of lymphocele, a sonogram was done within one month of surgery, and the obtained results were recorded on a premeditated checklist, as well as the serum creatinine of patients was recorded with a month gap mediated into a checklist. The findings were analyzed with SPSS software version 23. Moreover, the Kolmogorov-Smirnov

test was used to determine the normality of the data. The Mann-Whitney U test and Chi-square test were used to compare the case and control groups. A p-value of less than 0.05 was considered statistically significant. The conduction of this study had no interference with the normal pre-determined course of patient treatment, and written informed consent was obtained from each of the volunteer individuals. The study was conducted in compliance with the Helsinki declaration and was approved by the ethics committee of Tehran University of Medical Sciences with the following IR.AJAUMS.REC.1399.013 code.

## 4. Results

Of the 60 candidates, 37 (55%) were men, and 33 (45%) were women. The age range was 14 to 75 years. The weight range of the control group was between 46-104 kg, with a mean weight of 81.26 kg. The weight range for the case group ranged from 58-92 kg, with a mean weight of 79.4 kg. The average creatinine in the case group subjects was recorded as  $2.5 \pm 1.78$ , whereas the control group results were  $2.31 \pm 1.89$ . With the implementation of the Mann-Whitney U test, the two groups did not have a significant difference ( $P > 0.05$ ). In the sonograms done post-surgically within the span of 1 month, 17 of the case subjects developed lymphocele, where 12 of the control subjects developed lymphocele; however, the Chi-square test revealed no significant difference ( $P > 0.05$ ).

## 5. Discussion

Other studies conducted in correlation to the role of betadine in renal transplant have been focused on the treatment of post-transplantation lymphocele rather than prevention. The following study conducted focused on the role of betadine in the prevention of lymphocele. Damian and colleagues in a 6-person epidemiologic community were able to treat all six patients with the injection of 10 ml povidone-iodine of 10% (14), but the current conducted study has a significant difference in sample size with the Damian study.

Allagov and colleagues in another epidemiologic community case study found that patients that had undergone pelvic lymphadenectomy and later developed lymphocele were also cured using betadine treatment in combination with percutaneous drainage, as compared to solely treating patients with percutaneous drainage, with the latter having an efficacy of 73.4% (16). Allagov's study also focused on the effect of betadine treatment rather than prevention, which was the purpose of this conducted study. Bozkurt and colleagues also conducted a study supporting the effect of betadine on the treatment of lymphocele.

In the following study, the average creatinine between the case and control groups were compared, providing no significant difference between the two groups. This was a factor that has not been taken into consideration in any of the studies that have been conducted on the effects of betadine on lymphocele treatment. The results obtained from the comparison of creatinine levels can be considered as supportive for the obtained results from patient's follow-up sonograms, suggesting that the use of betadine as a preventive measure for the development of post-surgical lymphocele in renal transplant patients is ineffective. It is suggested that further studies should be conducted in larger epidemiologic communities in both of the effects of betadine in the prevention and treatment of lymphocele in renal transplant patients, as the conducted studies have comprised of small epidemiologic communities.

### 5.1. Conclusion

The study concluded the use of betadine in pre-surgical preparation for the prevention of post-surgical lymphocele was ineffective. Further studies with larger sample sizes are recommended.

### Footnotes

**Authors' Contribution:** Study concept and design: H.D and F.N; Analysis and interpretation of data: A.F, and Z.A; Drafting of the manuscript: M.K and B.E.; Critical revision of the manuscript for important intellectual content: M.H and D.F.

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