

Multidisciplinary Collaborative Operations of Urology and Other Surgical Specialties: Thirteen Years of Experience at a Single Center

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What's known on the subject? and What does the study add?

The multidisciplinary evaluation is known to be an essential component of today's medical practice. The urology department requires to be in communication with other surgical branches throughout the preoperative, intraoperative and postoperative periods due to the close neighboring of numerous organs and iatrogenic injuries. This is the first study in the literature to present a review of cases in which multidisciplinary surgeries were performed with the involvement of urology and other surgical specialties.

Abstract

Objective: Operative procedures performed collectively by urology and other surgical specialties were investigated in this study.

Materials and Methods: In this study, surgeries performed out at a single center throughout the 13 years' period between May 2008 and February 2021 were examined retrospectively, the operations performed by the urology department and other surgical branches jointly, the procedures executed and the reasons for perioperative consultation were reviewed through operative reports. The number of performed surgeries, their types, frequencies, the status of whether emergency or elective were observed separately and tables were created by determining the most frequently done collaborative operations.

Results: The total number of patients having collective surgeries was 472. Three hundred twenty-two of these consisted of operations in cooperation with general surgery, 94 with obstetrics and gynecology, 40 with cardiovascular surgery, 9 with orthopedics, 5 with thoracic surgery and 2 with plastic and reconstructive surgery branches.

Conclusion: Operations performed in collaboration with other surgical specialties reveal a multidisciplinary contribution in the assessment, treatment planning and surgical management of patients. The success of surgical treatment is closely related to the continuity of interdisciplinary communication and collective evaluations during and after surgery and before the surgery. As there are many surgical procedures performed by urology as part of a team with other branches, the review of these operations will help make more accurate and faster collaborative decisions in similar future cases that may be encountered.

Keywords: Multidisciplinary operations, multidisciplinary evaluation, urology, perioperative consultation

Introduction

The multidisciplinary approach, in modern age medical practice, where specialization in a branch is gradually increasing, makes it inevitable for the relevant disciplines to evaluate cases together and to cooperate in decisions and practices to better understand patients and diseases and to find more accurate solutions (1). In today's medical practices, interdisciplinary communication and

collaboration appear in both medical and surgical treatments. The multidisciplinary assessment, observed to be used in most of the surgical medicine practices, particularly within the oncological patient group, has improved the success related to the treatment and management of disease (2).

Communication between specialties is of great importance in relation to correct and effective coordination of treatment

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plans for both outpatients and inpatients. Upon review of the multidisciplinary evaluation with respect to patients requiring surgery, this includes the gradual processes ongoing before, during and after the operation. Thus, consultation of the relevant specialties before, during and after surgery, exchange of ideas, considering the recommendations throughout the determination of the management plan and its application may considerably affect the success of the treatment (3).

For emergency or elective surgeries, the surgeons of the relevant branches have to be involved in the operation due of emergency trauma within the operative field or conditions resulting from iatrogenic causes in the adjacent tissues concerning other specialties during the procedure. Also, in case of the primary disease impacting the organs of other branches, it may be necessary to evaluate the case collectively before surgery and subsequently to perform a collaborative surgery (4).

Due to the wide neighborhood of urogenital structures with respect to other organs, there are a considerable number of emergency or elective collective surgeries performed by the urology department with other surgical branches.

In our study, we, as the urology clinic, aim to review the surgeries performed by the urology department and other surgical branches collaboratively by screening 13 years of operative data and to publish the related data. This study is the only one on this subject examining the multidisciplinary approach of urologic surgical operations.

Materials and Methods

Between May 2008 and February 2021, the operations at University of Health Sciences Turkiye, Bakırköy Dr. Sadi Konuk Training and Research Hospital involving the Clinic of Urology and other surgical branches were scanned through the hospital automation system. By reviewing the surgical procedure names and the operative notes, the number of surgeries performed collaboratively, their types, frequencies, the status of whether emergency or elective were examined separately and tables were created by determining the most frequently done operations. Upon establishing the reason for including the other surgical branch throughout the surgery, pathologies, or the suspicion of iatrogenic damage, the purpose of the consultation request was recorded. The types of most commonly performed cooperative surgeries and the proportion of consultation requests in collective surgeries were demonstrated. Operations involving two different surgical branches simultaneously were included in the study, whilst similar procedures performed on the same patient more than once were documented as one case. Surgeries performed by two specialties together because of two completely independent indications (for example coexistence of bladder tumor and inguinal hernia) were excluded. Ethics

committee approval for the study dated 2021 and numbered 195 was obtained from University of Health Sciences Turkiye, Bakırköy Dr. Sadi Konuk Training and Research Hospital Ethics Committee. This study was conducted in accordance with the principles of the Declaration of Helsinki. Statistical analysis was not performed in our study.

Results

In our study investigating the operations involving urology and other branches, the total number of cases meeting the criteria was 472. Three hundred twenty-two of these cases consisted of operations in cooperation with general surgery (GS), 94 with obstetrics and gynecology (OB-GYN), 40 with cardiovascular surgery (CVS), 9 with orthopedics, 5 with thoracic surgery and 2 with plastic and reconstructive surgery (PRS) branches.

The species having the most collaborative surgical procedures with urology was GS. Of the 322 common cases, 108 were emergency operations and 214 were elective surgeries. GS was involved in 65 cases, whilst urology was included in 257 cases secondarily. The types of the surgeries performed collectively by urology and GS branches, their frequencies, the status of emergency or elective are provided in Table 1. It was observed that in 81 (31.5%) of the perioperative urology consultations requested by GS was due to iatrogenic organ damage. Ureteral injury was detected in 41 cases (50.6%), which constituted half of the iatrogenic injuries, bladder injury in 24 patients (29.6%), and urethral injury in 11 patients (13.6%). Additionally, Double J stent (DJs) implantation was applied by urology to protect the ureters in 33 (34.3%) cases that were operated by GS due to invasive mass. When the pathological results of 47 patients with rectal tumor, one of the most common conditions requiring consultation, were examined, it was observed that 30 patients (63.8%) were staged as T3-T4 according to TNM staging, and 22 patients (46.8%) were stage 3-4 patients. The reasons for

Table 1. Pathologies in joint operations of urology and general surgery branches and their frequencies

Emergency procedures		Elective procedures	
Clinical condition	Number of patients (%)	Clinical condition	Number of patients (%)
GSW-SW	38 (35.2)	Rectal tumor	47 (22)
Acute abdomen	22 (20.4)	Abdominal masses	44 (20.6)
Blunt trauma	14 (12.9)	Colon surgeries	35 (16.4)
Fournier gangrene	13 (12)	Fistules	18 (8.4)
Evisceration	9 (8.3)	Renal tumor	14 (6.5)
Other	12 (11.2)	Other	56 (26.1)
Total	108	Total	214

GSW: Gunshot wounds, SW: Stab wounds

consultations requested in the joint operations of GS and urology branches, the most common pathologies encountered, performed procedures and the rates are given in Table 2.

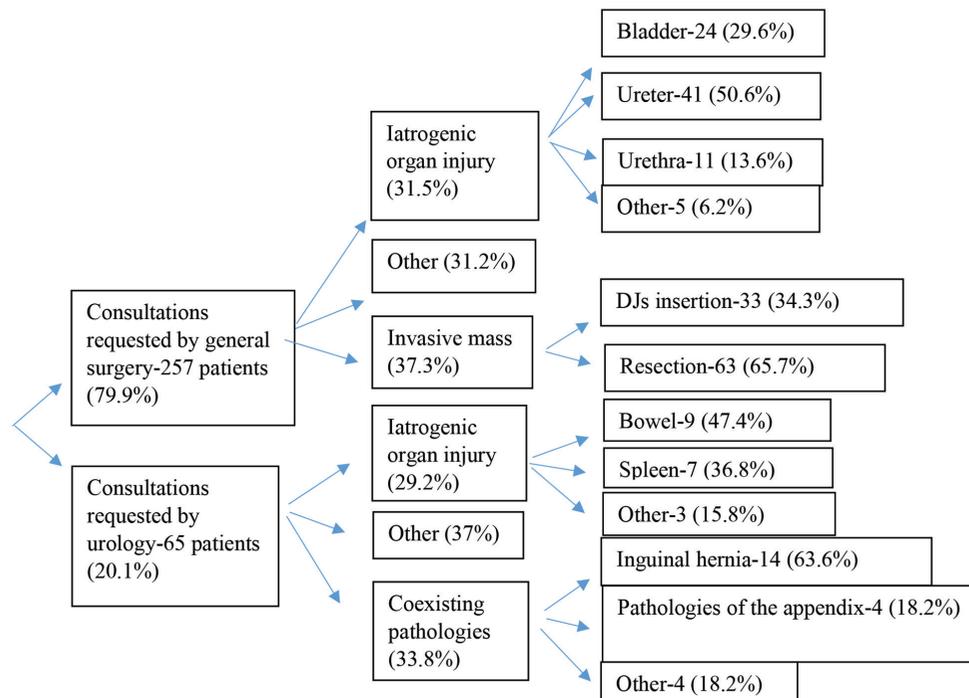
It was revealed that the specialty performing the second most frequent surgical operations with urology was the OB-GYN with 94 cases. Whilst 20 of these cases were emergency operations, 74 of them were planned as elective operations. The most common diseases and their frequencies in mutual surgeries are listed in Table 3. Among the operations performed collectively by urology and OB-GYN, it was observed that 58 cases (61.7%) were associated with iatrogenic injuries, of which 38 (66%) had bladder injury and 20 (34%) had ureteral injury. As there were 14 patients who underwent DJ insertion to protect the ureters without the presence of injury, 5 cases were identified to have simultaneous cystectomy due to an invasive genital mass. When the pathology results of 17 patients with ovarian tumor, which is one of the most common conditions requiring consultation, were examined, it was determined that 9 patients (53%) had stage 2B tumors according to the FIGO classification, 4 patients (23.5%) had stage 3 tumors, and 4 patients (23.5%) had stage 1 tumors. The reasons and frequencies of consultation requests in collaborative surgeries of urology and OB-GYN branches are summarized in Table 4.

We observed that the number of operations performed together by the specialties of urology and CVS was 40 and 16 of these (38.3%) were due to iatrogenic injuries in urology

procedures. It was determined that consultations requested in the perioperative period were most frequently due to injuries of the inferior vena cava, followed by the renal artery and other vessels. Whilst emergency surgery was carried out in 10 of 24 patients without iatrogenic injury due to gunshot wounds and stab wounds, CVS was included in the operations of 6 patients (25%) in relation to venous thrombus caused by kidney tumor. Examining the pathology results of 12 patients with kidney tumors, which is one of the most common conditions requiring consultation, 8 patients (66.7%) were found to have stage 3-4 disease. A total of 2 (16.7%) required intraoperative consultation because of renal artery and vein injury during radical nephrectomy resulting in stage 2 renal cell carcinoma. It was observed that renal vein damage occurred in 1 patient (8.3%) during open partial nephrectomy, and 1 patient (8.3%) was referred to CVS due to vena cava inferior damage during laparoscopic radical nephrectomy. The procedures involving urology and CVS branches together, their clinical features and frequencies are summarized in Tables 5 and 6.

There were 5 operations detected for engaging urology and thoracic surgery specialties, collectively. In 4 of these cases, the consultation was requested because of pleural injury. For one patient, diaphragm and pleural injury occurred simultaneously and along with thoracic surgery, GS was required to attend the operation. Of the 5 patients, 3 during nephrectomy for non-functioning kidney due to renal stone, 1 during radical

Table 2. Reasons and frequencies of the consultations requested in collaborative operations of urology and general surgery branches



DJs: Double J stent

nephrectomy because of kidney tumor, 1 while having percutaneous nephrolithotomy developed pleural injury. Upon perioperative evaluation, primary repair and thoracostomy were mostly applied to the patients.

The number of surgeries in which the branches of urology and orthopedics attended in cooperation was determined to be 9, of these, 1 was elective and 8 of them were documented as emergency operations due to trauma. Whilst most cases were surgeries involving numerous clinics due to multitrauma, bladder repair performed for 5 patients was revealed to be the most frequently performed urological procedure.

There were 2 operations identified which were carried out in collaboration with urology and PRS specialties. These cases were revealed to be reconstructive surgeries, previously done due to Fournier's gangrene and subsequently performed for closure of wound defects.

Discussion

Recently, a multidisciplinary approach has become critical in treatment planning, decision-making and follow-up, especially

for geriatric and oncology patient groups. For this purpose, multidisciplinary case evaluation committees have been established at hospitals, especially in elective cases, and these practices have entered our practice (5).

It is recognized that a multidisciplinary decision-making process may significantly reduce the extensive variation in decisions made by independent healthcare professionals (6). Multidisciplinary decision-making has become essential for centers providing oncological treatment. A treatment plan is formed with the joint assessment of both the surgical, internal and oncology departments. For surgical units, requiring consultation among themselves and the patient group requiring collaborative treatment is not negligible. Due to the wide breadth of the surgical field for urology, it should stay in contact with many branches.

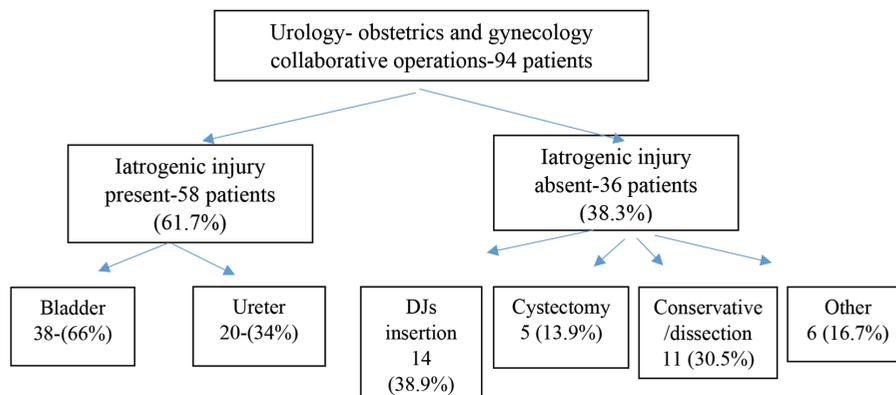
On examination of the branches operating jointly with urology, surgeries in collaboration with GS were demonstrated to be performed most frequently. It is possible to explain this situation with the variety of operations carried out by the specialty of GS and its wide area to the organs covered by urology. Especially in a center where oncological surgery is regularly performed,

Table 3. Pathologies in collective operations of urology and obstetrics and gynecology branches and their frequencies

Emergency operations		Elective operations	
Clinical condition	Number of patients (%)	Clinical condition	Number of patients (%)
Delivery/C section	8 (40)	Ovarian tumors	17 (22.9)
Hemorrhage	7 (35)	Myoma/endometriosis	12 (16.2)
Pelvic mass	2 (10)	Cervical tumors	11 (14.9)
Other	3 (15)	Delivery/C section	11 (14.9)
		Other gynecological malignancies	9 (12.2)
		Other	14 (18.9)
Total	20	Total	74

C section: Cesarean delivery

Table 4. Reasons and frequencies of the consultations requested in joint surgeries of urology and obstetrics and gynecology branches



DJs: Double J stent

interdisciplinary work is inevitable with respect to the surgical procedure of invasive masses (7). In our study, it was observed that most of the collective operations performed using the GS branch were not emergency surgeries, but nearly half of the them were surgeries performed out under elective conditions for stage 3-4 intra-abdominal cancer cases.

In our study, we found that approximately 1/3 of the operations performed jointly with GS were due to iatrogenic injuries. Perioperative consultation was required most frequently because of ureteral injuries. Although the most common cause of damaged ureters is iatrogenic injuries, any trauma occurring in the ureters may lead to severe sequelae (8). Whilst it is generally seen as a rare complication of colorectal surgeries, in the literature, it is stated that its incidence is increasing gradually and it is associated with high morbidity, mortality and the length of hospital stay (9). Ureteral injuries, in addition to appearing in the procedures of other branches requiring difficult dissection, are conditions that may be encountered even in the operations performed out by primary urology such as kidney tumor surgery (10). As risk factors leading to iatrogenic injury, factors such as situations disrupting the normal anatomy, malignancies,

previous surgery, radiotherapy history, diverticulitis and endometriosis have been indicated (11).

In consideration of the risk factors, iatrogenic ureteral injuries should be kept in mind as a complication that may occur in tertiary level treatment centers providing oncological surgery, and care must be taken to detect them in the intraoperative period.

It was reported in the literature that the bladder is the most frequently affected organ of the urinary system with respect to iatrogenic injuries (12). Bladder injury ratings of up to 4.5% have been documented for GS operations, especially in abdominal cytoreductive surgeries, and these rates were revealed to be between 0.12-0.41% in small-large bowel surgeries and rectal procedures (13,14). In our study, among the operations performed by GS and urology clinics collectively due to iatrogenic injury, we established that bladder injuries were the second in place.

With respect to the surgeries carried out by the OB-GYN, bladder, and ureter injuries may develop associated with the neighborhood of organs. It has been documented that the rate of ureteral injury in hysterectomy operations varies between 0.02% and 0.6%, depending on the type of hysterectomy procedure (15). It was determined that two-thirds of the surgeries performed by the OB-GYN in collaboration with urology at our center were related to iatrogenic organ damage.

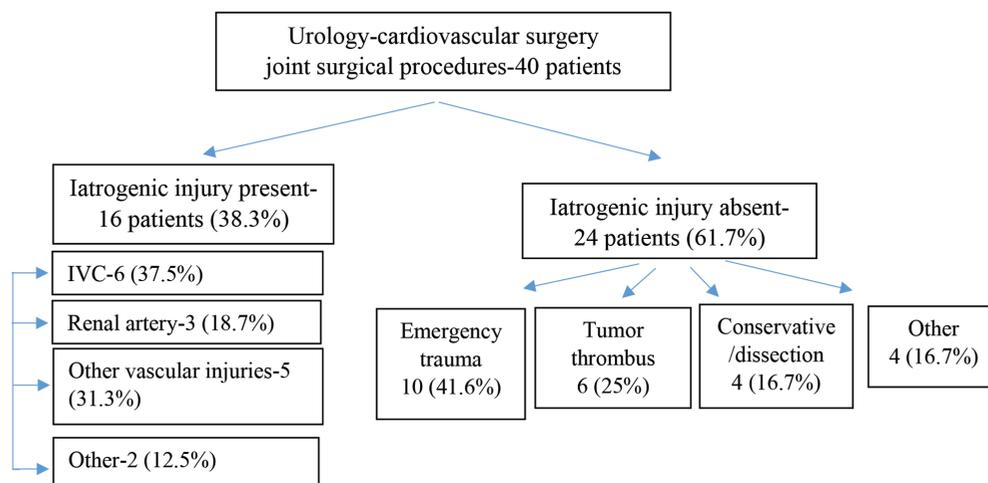
In centers performing advanced operations in terms of gynecologic oncology, because of invasive masses, the requirement for resection in relation to both adjacent organ injury and invasion confirms the necessity of preoperative and intraoperative consultation. Whilst ovarian tumor surgeries took the first place among the elective procedures done

Table 5. Pathologies in collaborative operations of urology and cardiovascular surgery branches and their frequencies

Clinical state	Number of patients (%)
GSW/SW	13 (22.9)
Renal tumor	12 (16.2)
Retroperitoneal lymph node dissection	5 (14.9)
Kidney transplant surgery	4 (14.9)
Other	6 (18.9)
Total	40

GSW: Gunshot wounds, SW: Stab wounds

Table 6. Reasons and frequencies of the consultations requested in collective operations of urology and cardiovascular surgery branches



IVC: Inferior vena cava

cooperatively at our center, uterine myoma surgeries and cervix tumors followed the lead. Five patients who underwent radical cystectomy for bladder invasion without any iatrogenic injury were identified. It is imperative that the decision for a major surgery such as radical cystectomy and urinary diversion, which will subsequently affect the quality of life and subsequent, should be made before surgery following interdisciplinary evaluation and obtaining their informed consent along with an explanation of the possible risks to the patients.

Inserting a DJ into the ureter for protection is revealed to be a significant situation that both GS and OB-GYN perform in cooperation with urology or necessitates a consultation. In our study, it was established that approximately one-third of the joint surgeries of GS, OB-GYN and urology, not caused by iatrogenic damage, were operations for prophylactic insertion of DJs. Nevertheless, it was reported in the literature that prophylactic stenting did not reduce the rate of ureteral injury (16). Yet, in complicated cases, the reasons for the preference of this practice include visualization of the ureter and aiding in the dissection during the operation by providing ease at palpation (17). It also provides an advantage in detecting ureteral damage if it occurs (18). Complications such as stent migration, oblivion, irritation, and cost analysis along with the risks of surgery should be carefully evaluated and prophylactic stenting should be applied in complicated cases (19).

On review of the collaborative surgeries concerning CVS and urology branches, it was revealed that they were performed after requesting perioperative consultation for iatrogenic vascular injury in 16 patients (38%). Intraoperative vascular injuries are commonly encountered. Decision-making occurs in a very short time frame following a life-threatening intraoperative vascular injury. Identifying the source of hemorrhage, initiating first-line hemostatic measures, and applying operative repair maneuvers and techniques have proven to be crucial for maintaining haemodynamic stability and cessation of bleeding (20).

Inferior vena cava (IVC) injuries were observed to be first in line amongst iatrogenic vascular injuries for urological surgeries carried out in cooperation with CVS at our hospital. Bleeding from IVC is one of the most frightening situations a surgeon may be involved in. The management of small venous tears may be easy, whereas in large defects, Satinsky clamps are used to partially or completely occlude the IVC and injury is primarily repaired by 4-0/5-0 polypropylene sutures (21). For patients with inadequate primary repair, as may also be predicted on preoperative assessments, more complex vascular reconstructions (vascular patch graft, tube-interposition graft) may be required (22).

At our hospital, apart from iatrogenic reasons, it was noted that the most common operation performed collaboratively by

urology and CVS clinics was radical nephrectomy procedures performed out due to renal tumor accompanied by a thrombus in the renal vein or vena cava. In renal cell carcinoma, venous involvement develops as a tumor thrombus in the renal vein on the affected side with the potential to extend into the IVC and even the right atrium. At the time of diagnosis, approximately 10% of the patients have predisposition for tumor thrombus in the renal vein or IVC and more frequently on the right side (22,23).

In our study investigating the joint operations of urology branch and other specialties, it was demonstrated that for most surgeries, the requirement for consultation could be anticipated before the operation. Upon examining the surgical procedures under 2 groups as emergency and elective cases, in elective operations we believe that for pathologies involving more than one specialty without any iatrogenic damage or unexpected situation during the surgery, it is necessary to form a collaborative surgical decision with an interdisciplinary evaluation before surgery. This highlights the significance of risk calculation and preoperative discussion related to possible scenarios along with obtaining informed consent from the patient. For instance, as ureteral damage or resection in the operation of a tumor invading the ureter or located closely may necessitate the insertion of a ureteral stent or nephrostomy, before surgery, it would be required to notify the patient and to receive informed consent from the patient.

We consider that being aware of the surgical procedures involving at least two branches and of the conditions in which the consultation is needed during the operation is also crucial for the training of surgical residents. With the increase in specialization, appreciating comprehensive assessments, holistic evaluation of the patients preoperatively and intraoperatively, and when necessary, asking for opinions of other branches or requesting a consultation must be a fundamental part of the residency training process.

Study Limitations

The limitations of our study include examining the results of only one center, designed retrospectively and not specifying the percentage of consultation or iatrogenic damage on a case-by-case basis. However, upon review of the literature, it may be concluded that it is the only study on multidisciplinary surgeries of urology with other surgical branches. Further studies containing more detailed and extensive case series may be conducted in the future.

Conclusion

Evaluation, treatment planning and management of surgical patients, whose care is predicted to require the involvement

of different branches, should be conducted multidisciplinary prior to surgery along with the application of the joint decisions taken, and consultation requests must not be avoided during surgery when necessary. As the urology branch has an intensive collaboration with other surgical specialties, investigation of the reasons for perioperative consultation will play an important role in determining more planned treatment management.

Ethics

Ethics Committee Approval: Ethics committee approval for the study dated 2021 and numbered 195 was obtained from University of Health Sciences Türkiye, Bakırköy Dr. Sadi Konuk Training and Research Hospital Ethics Committee. This study was conducted in accordance with the principles of the Declaration of Helsinki.

Informed Consent: Informed consent was obtained.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: H.Y., E.G., Concept: U.S., E.G., Design: H.P., H.Y., Data Collection or Processing: U.S., Analysis or Interpretation: U.S., E.G., Literature Search: H.P., H.Y., Writing: U.S., H.P.

Conflict of Interest: No conflict of interest was declared by the authors.

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