

## EXCRETORY UROGRAPHY IN PATIENTS PREPARED BY SIMETHICON (ESPUMISAN®)

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Espumisan® is one of the final preparations for oral administration that eliminates gases from the gastrointestinal tract. The drug is in the form of soft capsules gelatin. Each capsule contains 40 mg of simethicon. Espumisan® works by dissolving gas bubbles in the chyme, which are then absorbed through the intestinal tract wall or eliminated in the form of gas fluid.

Material consists of 700 intravenous urographies (IVU) performed at the Center for Radiology, Clinical Center in Niš, in the period January – December, 2009. Patients were prepared for IVU by Espumisan® as follows: on the day before the examination two capsules three times daily orally, following by one capsule in the morning on the day of examination. Radiological review was made on an X-ray device with a chain Schimadzu TV. An X-ray image was digitally processed in Agfa CR-30 digital processor.

The results are shown illustratively, by urographic images.

The authors conclude that Espumisan® provides fast, reliable, efficient and simple preparation of patients for intravenous urography. Also, it enables fast, easy and effective endography view (IVU) with satisfactory quality and adequate contrast visualization. Adverse reactions to Espumisan® have not been detected. *Acta Medica Medianae* 2011;50(1):38-43.

**Key words:** *Espumisan, Simethicon, radiology, urography, preparation, patient*

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### Introduction

Regarding its possibility to reproduce the entire urinary system including shape, size, position, number, functional abilities, and often anomalous material failure, pelvis and calix system, ureters and bladder, intravenous urography (IVU), injection or infusion, is very valuable, indispensable, and often sufficient diagnostic tool (1-10). Its performance requires the application of iodine contrast media. In order to achieve the high diagnostic effect and to avoid repetition of views and possible occurrence of any adverse reactions to the injected iodine contrast media (1-3), it is necessary to perform adequate patient preparation for the procedure (6,9,10).

First-line preparation for the procedure should be performed by all physicians who initiate this method. The radiologist should not be passive, but rather actively participate and

represent the last barrier that should be overpassed. However, he must personally check the contraindications for iodine contrast media of IVU or any other endographic review.

If the patient is inadequately prepared, there are two options for the radiologist: to perform a native radiogram of the urinary tract (which is included in IVU) and to implement the urography (if he deems the intestinal contents and gas from the digestive tract would not significantly affect the interpretation). Otherwise, he should abandon the examination and instruct the patient regarding preparation (psychological, prophylactic-medication, diet and hydration preparation) for urographic examination. Another possibility is to refer the patient to radiological examination method which does not require the use of iodine contrast media (ultrasound, CT native, magnetic resonance imaging, etc.).

Espumisan® represents one of the final preparations for oral application, which eliminates the gases from the gastrointestinal tract in patients for IVU.

Espumisan® is antifatulans that reduces symptoms of the gastrointestinal tract caused by gases. The drug is in the form of soft gelatin capsules taken orally, at any time and any place, because the capsules can be easily swallowed without water. Each capsule contains 40 mg of active ingredients - simethicon.

Simethicon works by changing the surface tension of gas bubbles trapped in the food and mucous alimentary canals. First, it reduces surface tension of gas bubbles, and then degrades it. Liberated gases can be easily absorbed through the intestinal wall or eliminated by enterokinesis. It should be emphasized that simethicon acts purely physically, does not enter the circulation and does not participate in chemical reactions.

There are the following indications for the use of simethicon: preparation for radiographic examination (chest X-ray native urinary tract, IVU, urinary urethrocytography, cystography, CT abdomen, pelvis, kidney and others, MRI of the abdomen and kidney, ECHO abdomen, kidney, prostate, etc.) and symptomatic treatment of problems that cause distension. Hypersensitivity to one or more components of the drug represents the contraindication (11).

Patient preparation protocol for radiographic examination using Espumisan® includes: three times daily two capsules orally on the day before examination, followed by one capsule in the morning on the day of examination.

Espumisan® is safe for pregnant women, nursing mothers and infants, and may be used by diabetics. The duration of therapy with Espumisan® is conditioned by the nature of complaints. So far, adverse effects related to use of Espumisan® as well as interactions with other drugs have not been described. The drug is issued without medical prescription.

The paper aims to show the advantage of preparing patients for IVU by Espumisan® regarding its quality and safety.

### Patients and methods

The paper deals with quality, contrasting and visualization of intravenous urography (IVU) in a series of 700 patients, which are made at the Radiology Institute of Clinical Center Niš during the period January-December 2009. Patient preparation for IVU was performed by Espumisan®, according to the following protocol: three times daily two capsules orally on the day before the examination, followed by one capsule in the morning on the day of examination. Radiology

review was made on an X-ray device with TV chain Shimadzu. The X-ray image was digitally processed on Agfa CR-30 digital processor. Espumisan® use safety was analyzed by side effects detection before, during and after the procedure, as well as the anamnestic data obtained following the procedure.

### Our experience

During the follow-up period, IVU was performed in 700 patients of both sexes. General characteristics are shown in Table 1.

Women are significantly more likely to be present in the study group ( $p < 0.005$ ). The average age of women was lower than in men, but without statistically significant differences (Table 1).

Analysis of the safety profile of Espumisan® showed that none of the 700 patients had adverse reactions to its implementation, as in the period before and immediately after the execution of IVU (Figure 1).

Table 1. General characteristics of patients with IVU

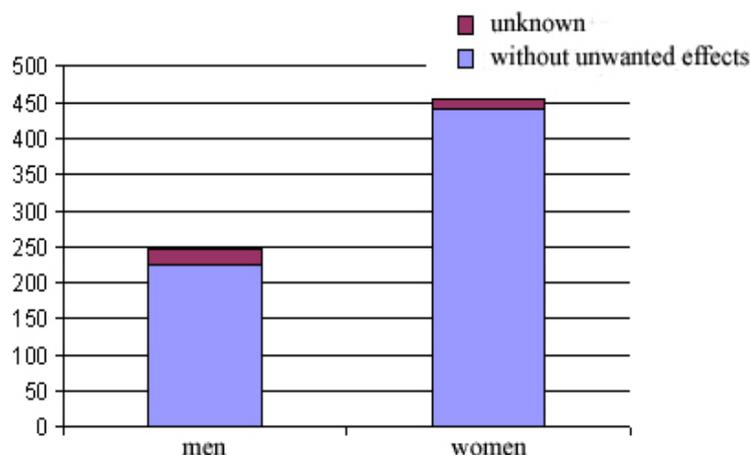
	Number	%	Age
Women	455	75*	52.1±6.8
Men	245	35	58.4±9.1

Data are presented as number, percentage and mean  $\pm$  SD, \*  $p < 0.05$

Women are significantly more likely to be present in the study group ( $p < 0.005$ ). The average age of women was lower than in men, but, there were no statistically significant differences (Table 1).

Analysis of the safety profile of Espumisan® showed that none of the 700 patients had adverse reactions to its implementation, as in the period before and immediately after the execution of IVU (Graph 1).

The analysis of obtained IVU reveals that Espumisan® yields significant results in the obtained quality, contrasting and visualization. The study results are presented by illustrations and IVU images.



Graph 1. Analysis of the safety profile of Espumisan®



Figure 1. Kidney and bladder multiple calculosis



Figure 2. Calculus of left ureter with ipsilateral hydronephrosis



Figure 3. Calculus of the right ureter with ipsilateral hydronephrosis

Figure 1 shows a native radiograph of the urinary tract and IVU at 5 and 10 minutes. Methods of examination: plain abdominal radiography and intravenous urography of the urinary tract by standard protocol. Preparation of patients: the day before the examination, oral administration, three times daily 2 capsules, and on the day of

examination, a capsule of Espumisan®. Contrast media: Ultravist 370®, administered in a bolus intravenously through intravenously placed and fixed braunila. X-ray images are digitally processed in Agfa CR-30 digital processor. We visualized at the height of the first, second and third lumbar vertebrae (L1-L3) multiple shadows of calcium intensity, up to 6mm in diameter, corresponding to calculus of both pyelon and caliceal system. Two pelvic shadows of calcium intensity, distinct, with diameter of 2.02cm and 2.64cm, corresponding to bladder stone. Kidneys are of proper position, shape, size and function. Pyelocaliceal systems branched, deformed patella as a result of calculi. Ureters in good position, course, sharply outlined contours, the diameter in the range of normal, unobstructed. Proper position of bladder, sharply delineated.

Figure 2 shows a native digital radiograph of the urinary tract and digital urogram at 5 minutes. Methods of examination: plain abdominal radiography and intravenous urography of the urinary tract by standard protocol. Preparation of patients: the day before examination oral administration, three times daily 2 capsules, and on the day of examination a capsule of Espumisan®. Contrast media: Ultravist 370®. We visualized the left, at the height of the first lumbar vertebra (L1), solitary, oval shadow of calcium intensity, the diameter up to 13mm, which corresponds to the initial portion of calculus in the lumbar segment of the left ureter. The kidneys are in good position, shape, size and function. Left kidney contrast media excrete slowly. Right kidney contrast media excretes promptly. Pyelocaliceal systems are branched, on the right the regular calix and pyelon, the left ones dilated, progressed to «clubbing», balloon calices. Right ureter of proper position, course, diameter to pass through. The left ureter obstructed by anorganic calculus (described above). Bladder is regular on IVU findings.

Figure 3 shows calculus of the right ureter with ipsilateral hydronephrosis. Paired kidneys. Elongated large calix for the upper half of both kidneys. The picture shows a native digital radiograph of the urinary tract and digital urogram at 5 minuta. Examination methods: native urinary tract radiography and intravenous urography by standard protocol. Preparation of patients was conducted by Espumisan®. Contrast media: Ultravist 370®. Oval shadow of calcium intensity, solitary, up to 5 mm in diameter is visualized on the right side, at the level of the third lumbar vertebra (L2-L3), which corresponds to calculus of the initial part of the right ureter. The kidneys are in good position, shape, size and function. Right kidney excretes contrast media slowly, while the left kidney contrast media was excreted promptly. Pyelocaliceal systems are branched, paired, with elongated large calices in the upper half. Pyelocaliceal right system dilated, with calices of flattened fornix. Right ureter obstructed by previously described anorganic calculus, while the left ureter is with proper position, length, diameter to pass through. Bladder is regular on IVU findings.



Figure 4. Tumor of the left ureter. Caliectasia of left pyelocaliceal system.

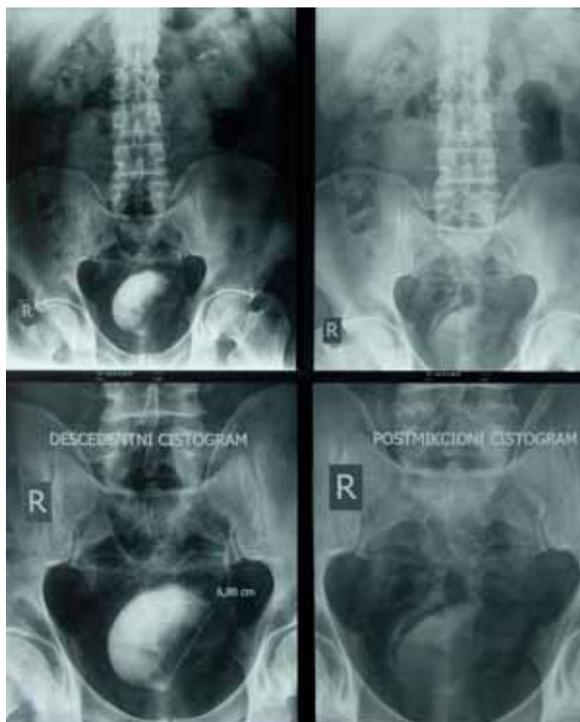


Figure 5 Bladder tumor



Figure 6. Anorganic bladder stone



Figure 7. Prostate benign hyperplasia. Diverticulum and cancer of bladder

Figure 4 shows the targeted digital IVU of the left kidney. Methods of examination: plain abdominal radiography and intravenous urography of the urinary tract by standard protocol. Preparation of patients was conducted by Espumisan®. Contrast media: Ultravist 370®. Visualized kidneys of proper position, shape, size and function. In the initial part of the left ureter, at the projection level of the second and third lumbar vertebrae (L2-L3), soft tissue, non-homogenous, irregular shadow, clear-cut contours, the diameter of about 6.39x2,64cm, which corresponds to the tumor of the left ureter. The other parts of urinary system within the normal range.

Figure 5 shows the digital IVU for 15 minutes, descendent radiograph of the bladder and X-ray image after urination. Methods of examination: plain abdominal radiography and intravenous urography of the urinary tract by standard protocol. Preparation of patients was conducted by Espumisan®. Contrast media: Ultravist 370®. Kidneys with proper position, shape, size, functional, branched. Pyelocaliceal systems of regular calices and pyelon. Ureters proper and accessible. Bladder with the defect, the left lateral, irregular appearance, size 6.8cm, clear-cut contours, corresponding to primary infiltrative process.

Figure 6 shows the native digital radiograph of the urinary tract. Methods of examination: plain abdominal radiography and intravenous urography of the urinary tract by standard protocol. Preparation of patients: the day before examination, oral administration, three times daily 2 capsules, and on the day of examination one capsule of Espumisan®. Contrast media: Ultravist 370®. Visualized pelvic solitary shadow, intensity of calcium, 2.66cm in diameter, strongly delineated, which is assigned to the anorganic bladder stone. Kidneys of

proper position, shape, sharply outlined contours, diameter within normal range, functional, neat canal system.

Figure 7 shows the digital urogram for 15 minutes, postmiction urogram, descendent cystogram and postmiction cystogram. Methods of examination: plain abdominal radiography and intravenous urography of the urinary tract by standard protocol. Preparation of patients was conducted by Espumisan®. Contrast media: Ultravist 370®. Kidneys of proper position, shape, size and function, branched. Pyelocaliceal systems of regular calices and pyelon. Ureters proper and accessible. Bladder position proper, base elevation of the arc due to enlarged prostate. Right, lateral wall of the bladder diverticulum, in diameter about 1cm laterally on the left and proximally, a defect in contrast, approximately 2cm, clear-cut contours,

corresponding to a broad base of infiltration process.

## Conclusion

Quick and effective elimination of gases from gastrointestinal tract of patients for radiographic examination (chest X-ray native urinary tract, IVU, etc.) is obtained by Espumisan®.

Espumisan® provides fast, reliable, efficient and simple preparation of patients for IVU. The native radiography of the urinary tract and IVU in 700 radiologically examined patients in whom the preparation was conducted by Espumisan® provide a satisfactory quality, sharp contrasts and adequate visualization of the urinary system. Adverse reactions to Espumisan® have not been detected.

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## **INTRAVENSKA UROGRAFIJA POSLE PRIPREME BOLESNIKA SIMETHICON-OM (ESPUMISAN®)**

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i Svetlana Marković Perić*

Espumisan® (Simethicon) je jedan od gotovih preparata za peroralnu primenu koji eliminiše gasove iz gastrointestinalnog trakta. Lek je u formi mekih želatinoznih kapsula. Svaka kapsula sadrži 40 mg simetikona. Espumisan® deluje tako što razgrađuje mehuriće gasa u himusu, koji zatim biva apsorbovan preko zida intestinalnog trakta ili eliminisan enterokinezijom.

Cilj rada bio je da se prikaže efikasnost pripreme bolesnika za intravensku urografiju korišćenjem Espumisana, u pogledu kvaliteta načinjenih intravenskih urografija i bezbednosti primene Espumisana.

U radu su analizirani kvalitet, kontrastnost i vizuelizacija intravenskih urografija (IVU) na seriji od 700 bolesnika, koje su urađene u Centru za radiologiju Kliničkog centra u Nišu, tokom perioda januar-decembar 2009. godine. Priprema bolesnika za IVU sprovedena je Espumisan®-om po sledećem protokolu: bolesnik dan pre pregleda peroralno uzima 3 puta po 2 kapsule, a na dan pregleda, ujutru, peroralno 1 kapsulu. Rendgenološki pregled je rađen na rendgen aparatu sa TV lancem Schimadzu. Rendgenska slika je digitalno obrađivana na Agfa CR-30 digitalnom procesoru. Bezbednost primene Espumisana analizirana je registrovanjem neželjenih efekata pre izvođenja i nakon izvođenja IVU.

Analizom dobijenih IVU pokazano je da Espumisan pokazuje značajne rezultate u dobijenom kvalitetu, kontrastnosti i vizuelizaciji. Analiza bezbedonosnog profila Espumisana pokazala je da ni jedan od 700 bolesnika nije imao neželjene reakcije na njegovu primenu, kako u periodu pre tako i neposredno nakon izvođenja IVU. Rezultati rada prikazani su ilustrativno, slikama uograma.

Espumisan® pruža brzu, pouzdanu, efikasnu i jednostavnu pripremu bolesnika za intravensku urografiju, brz, lagan i efikasan endografski pregled (IVU), dok su dobijeni uogrami zadovoljavajućeg kvaliteta, kontrastnosti i adekvatne vizualizacije urosistema. Neželjenih reakcija na Espumisan® nije bilo. *Acta Medica Medianae 2011;50(1):38-43.*

**Ključne reči:** *espumisan, simethicon, radiologija, intravenska urografija, priprema*