OPERATIVE ACCESS TO KIDNEY WITHOUT DAMAGE OF LUMBAR AND INTERCOSTAL MUSCLES, VESSELS AND NERVES

The purpose of the study is a search of operative access to the kidney with less surgical trauma and associated complications. Specific research tasks included experiment on the dead bodies of people to develop operative access to the kidney without the transversal section of muscles and damage of intercostal and lumbar vessels and nerves. The research also studied the parameters of access using the Sozon-Yaroshevich method (1954) to estimate his appropriateness in surgical practice.

Operative access to the kidney with the longitudinal section of latissimus dorsi muscle and the XII rib is anatomically justified and possesses parameters which are sufficient for the successful conducting of operations on a kidney and upper departments of the urine excretion system. The suggested operative access to the kidney eliminates the damage of intercostal and lumbar muscles, vessels and nerves. Application of this operative access method to the kidney in treatment of urology patients decreases time of their treatment and eliminates relaxation of abdominal muscles and development of postoperative lumbar hernia.

Keywords: Urology, the operative access to the kidney
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Introduction

The introduction of new technologies in urology radically changed methods of operative access to the kidney and ureter. Preference is given to high-tech and low-invasive methods. However, the open method of intervention has not lost their clinical significance. Operative interference by opened method is approved to the 24-25% to the patients with an urolithiasis (Dzeranov, Kazachenko, Beshliev et al., 2002). The disadvantages of known surgical approaches to the kidney include dissection of intercostal and subcostal muscles, damaging of surrounding nerves, paresis and relaxation of the abdominal muscles, its functional failure. Most often, these complications arise in repeated operations in patients with recurrent form of urolithiasis when operative access is executed with excision of old postoperative scars (Agrawal, Singh, and Singh, 2009).

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Materials and methods

Operative access to the kidney and upper ureter was made in 27 dead human bodies (17 male and 10 female). The age of the experienced cadavers ranged between 23 and 72 years. The examinations were conducted in the normal position of the object with the
roller under the waist, with a bent lower extremity of healthy side and the direct position of opposite extremity.

All stages of research were carried out with permission an ethics committee.

Set task is solved by the fact that the skin, the hypodermic-fatty layer, superficial fascia and the latissimus dorsi muscle are dissected along its fibers through the middle of the rib XII to its length (Figure 1).

Edges of the cut are moved apart with extenders and the lateral arcs of X, XI, XII ribs are exposed. By a circular electric milling cutter (Diameter=3 cm) XII a rib is cut strictly along the longitudinal axis from end to the outward edge of extensor muscle of the back together with the transversal fascia (Figure 2).

**Figure 1. Incision of the Skin and the Latissimus Dorsi Muscle in the Early Operative Access to the Kidney**

**Figure 2. View of XII Rib Sectioned Longitudinally**

Aponeurotic sheaths of the external oblique, internal oblique and transverse abdominal muscles, fixed by the end of XII rib, are cut along the section. Fragments of ribs and the edges of dissected aponeurosis are moved apart the sides with rack extender with hinged brackets covering the entire length of the fragments of the ribs. Under the pressure of brackets, the subperiosteal fracture of lower fragment of rib happens at the edge of the back extensor muscle with angular displacement, opened forward. Periosteeum and bunches back lower stair muscle retain the fragment from displacement on a width. Spreading apart the fragments of the XII rib opens the cellulose of own retroperitoneum. Its separation from ribs and diaphragm and taking forward (Figure 3) opens the back surface of kidney, renal pelvis and overhead department of ureter. The back parnephritis is opened above them and operative reception (pelviliolithotomy, ureterolithotomy, removal of kidney or adrenal gland) is executed. There is no need to isolate from paraneprhic cellulose a kidney along the whole length as in lumbar access by Fedorov. The removal of kidney begins with bandaging and crossing of ureter, followed with mobilization, bandaging and crossing blood kidney vessels between clamps. Retroperitoneal cellular space is drained with pipe drainage insurance under the mid of XII rib.
Wound suturing begins with sewing together of the ideally matching fragments of XII rib using circular seams (Figures 3, 4).

In this case, the needle is carried out strictly according to their outer edges, eliminating capture of the adjacent vessels and nerves. This saves natural places of muscles fixing to XII rib, integrity of them and their adjacent vessels and nerves.

Perfectly associated rib fragments are fused with callus, bypassing the stage of connective calluses. If required open-kidney reoperation, XII edge can be cut without damaging the adjacent muscles, vessels and nerves.

The edges of the layered latissimus dorsi muscle, fascia and skin incisions are sewn with single interrupted sutures. The study of access parameters and comparing them with satisfactory parameters on the Sozon-Yaroshevich showed the following results (Table 1).
The observed operative access was applied in clinical practice in 5 patients with urolithiasis; in one of them the illness was recurrent. Concrements were localized in renal pelvis, were large and required fragmentation using minimally invasive contact or distance shock wave method.

**TABLE 1. COMPARISON OF THE PARAMETERS OF REAL-TIME ACCESS TO THE KIDNEY WITH DISSECTION OF XII RIB ALONG THE LONGITUDINAL AXIS WITH THE PARAMETERS RECOGNIZED BY THE A.YU. SOZONOV-YAROSHEVICH AS SATISFACTORY (n = 27)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value in research</th>
<th>Value by the A.Yu. Sozonov-Yaroshevich</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth of wound (cm)</td>
<td>6.49±0.11</td>
<td>no more than 8 cm</td>
</tr>
<tr>
<td>Angle of slope of operating action axis (degrees)</td>
<td>87.4±0.42</td>
<td>75-90°</td>
</tr>
<tr>
<td>Angle of operating action on the length of wound (degrees)</td>
<td>95.13±1.0</td>
<td>Nearer to 90°</td>
</tr>
<tr>
<td>Angle of the operating action on the width of wound (degrees)</td>
<td>60.93±1.21</td>
<td>not determined by the A.Yu. Sozonov-Yaroshevich</td>
</tr>
</tbody>
</table>

Accessing the kidney by Fedorov dissects the external and internal obloques, the transverse muscle divorces along fibers; the approach quite often damages infracostal and ilio-hypogastric nerves. The access with the longitudinal section of the XII rib does not cause substantial damaging of the front paranephritis.

**Conclusion**

Operative access to the kidney with the longitudinal section of latissimus dorsi muscle and the XII rib is anatomically justified and possesses parameters which are sufficient for the successful conducting of operations on a kidney and upper departments of the urine excretion system.

The suggested operative access to the kidney eliminates the damage of intercostal and lumbar muscles, vessels and nerves.

Application of this operative access method to the kidney in treatment of urology patients decreases time of their treatment and eliminates relaxation of abdominal muscles and development of postoperative lumbar hernia.

**References**


Dzeranov, N., Kazachenko, A., Beshliev, D. et al., 2002. Complications of the opened operations at treatment of urolithiasis and way of their prophylaxis, Urology [Urologiya], No.6, pp.3-8

Sozon-Yaroshevich, A., 1954. Anatomical and clinical grounds of surgical accesses to the internals [Anatomoklinicheskie obosnovaniya hirurgicheskikh dostupov k vnutrennim organam], Moscow: Medgiz