INTRAABDOMINAL PRESSURE CHANGE UNDER ABDOMINAL SURGERY

Abstract. Statement of the problem. Intraabdominal hypertension (IAH) recognized as important consequence of surgery intraabdominal or on abdominal wall.

For a pity there are no signs to predict the possibility of such a dangerous complication.

Aim of study: to find out changes of intraabdominal pressure (IAP) corresponding to different kind of abdominal surgeries.

Material and methods. IAP had been measured in 15 patients before, immediately after, and 1, and 3-4 days since open surgery. Also, IAP had been measured in 5 patients before and after laparoscopic surgeries.

IAP was measured by urinal bladder way.

Results and discussion. Before surgery IAP was find at level 10 cm H2O or higher in 3 patients, but not higher than 15 cm in none of them.

There was not estimated direct connection between IAP and diagnosis. Of 2 patients with large incisional hernia and abdominal wall defect 243 cm² and 832 cm² in size IAP before surgery was stated as 3 and 14 cm H2O, respectively, while in the latter there were no any little of compression.

There was no firm interconnection between anesthesia mode and IAP.

Immediately after surgery IAP became equal to 10 cm H2O or higher in 13 patients, of them in 4 it was 20 cm H2O or higher. On the next day after surgery IAP leveled to 10 cm H2O or higher in 7 patients, of them in 3 it was 20 cm H2O or higher. One of the latter died, all other patients survived.

In all patients operated in laparoscopic way IAP measured through intrabladder catheter was 7-11 cm H2O lower than those on insufflator manometer.

Conclusions. IAP assay via urinary bladder pressure estimating is not the IAP measurement but indicator of urinary bladder tone.

As high IAP in many cases correspond to patient’s grave condition and even death it is of importance to study the real reason of this indicator.

Key words: intraabdominal pressure, abdominal surgery.

Statement of the problem

Intraabdominal hypertension (IAH) recognized as important consequence of surgery intraabdominal or on abdominal wall. As the indicator of IAH the last international consensus established sign 17 cm H2O measured via urinary bladder [1].

For a pity there a no signs to predict the possibility of such a dangerous complication [2].

That by itself is a menace of abdominal compartment-syndrome (ACS) emergence which, in turn, is the life-threatening condition. Hospital mortality was 33.6%-60% [2, 3]

To complicate this, there are no unanimous acknowledgement of level IAH corresponding to ACS appearance. In previous years cutoff value for IAP of 20 or 23 mmHg was considered an optimal point predicting ACS appearance and high mortality [2-4]. It reflects insufficient knowledge of the real pathogenesis of this pathology and, subsequently, uncertainty in proposed ways of intensive care or indications to surgical abdominal decompression.

Aim of study

To find out changes of intraabdominal pressure (IAP) corresponding to different surgeries on abdominal wall and intraabdominal organs and their significance to surgeon way of treatment.

Material and methods

IAP had been measured in 15 patients before, immediately after, and 1, and 3-4 days since open surgery. Over and above that IAP had been measured...
in 5 patients before and after laparoscopic surgeries and those indications were contrasted to marks of insufflator.

Because of inguinal hernia was operated 1 patient, incisional hernia 1, recti abdominal muscles diastasis 2, rectal cancer 2, colon cancer 2, metabolic syndrome 3, biliary duct cancer 1, pancreatic cancer 1, combined cystoecele 2, for ileostomy closing 1.

IAP was measured by estimation of manometer water column height connected to catheter introduced into urinal bladder after filling it with 50 ml of warm 0.9% sodium chloride solution.

Results and discussion
Before surgery IAP was find at level 10 cm H₂O or higher in 3 patients, but not higher than 15 cm in none of them (Table 1).

![Table 1](image)

<table>
<thead>
<tr>
<th>Patient ID</th>
<th>Pathology</th>
<th>N</th>
<th>BMI ⋅ kg/cm²</th>
<th>IAP cm H₂O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>inguinal hernia</td>
<td>2</td>
<td>25-27</td>
<td>3-5</td>
</tr>
<tr>
<td>2</td>
<td>incisional hernia</td>
<td>2</td>
<td>27-29</td>
<td>3-5</td>
</tr>
<tr>
<td>3</td>
<td>recti muscles diastasis</td>
<td>3</td>
<td>27-61</td>
<td>5-7</td>
</tr>
<tr>
<td>4</td>
<td>rectum cancer</td>
<td>2</td>
<td>26-30</td>
<td>4-7</td>
</tr>
<tr>
<td>5</td>
<td>colon cancer</td>
<td>3</td>
<td>27-29</td>
<td>5-6</td>
</tr>
<tr>
<td>6</td>
<td>metabolic syndrome</td>
<td>3</td>
<td>39-46</td>
<td>10-14</td>
</tr>
<tr>
<td>7</td>
<td>extraperitoneal biliary cancer</td>
<td>1</td>
<td>24</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>pancreatic cancer</td>
<td>2</td>
<td>27-29</td>
<td>6-7</td>
</tr>
<tr>
<td>9</td>
<td>combined rectocystecele</td>
<td>2</td>
<td>21-23</td>
<td>7-8</td>
</tr>
<tr>
<td>10</td>
<td>ileostomy</td>
<td>1</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>calculous cholecystitis</td>
<td>5</td>
<td>26-29</td>
<td>3-5</td>
</tr>
</tbody>
</table>

There was not estimated direct connection between IAP and diagnosis. Of 2 patients with large incisional hernia and abdominal wall defect 243 cm²and 832 cm² in size IAP before surgery was stated as 3 and 14 cm H₂O, respectively, while in the latter there were no any little of compression because 78% volume of intraabdominal organs was actually outside of abdominal cavity.

There was no firm interconnection between anesthesia mode and IAP (Table 2).

Table 2 data explicitly shows that, despite SA considered as much less traumatic in compare to ETN and it had been used in cases of inguinal hernioplasty which also considered as that that do not impact patient significantly [5], we found it substantial rise while measured out immediately after surgery. Such finding looks astounding confronting to so little changes of IAP linked to open preperitoneal incisional hernioplasty under ETN. No matter of reference to only solitary instances. Conclusion had been made on the base of such distinct clinical and pathogenic characteristics of both kinds of anesthesia and surgery that cannot presume any other possibility.

Immediately after surgery IAP became equal to 10 cm H₂O or higher in 13 patients, of them in 4 it was 20 cm H₂O or higher. On the next day after surgery IAP leveled to 10 cm H₂O or higher in 7 patients, of them in 3 it was 20 cm H₂O or higher. One of the latter died, all other patients survived (Table 3).

<table>
<thead>
<tr>
<th>Surgery</th>
<th>Anesthesia</th>
<th>N</th>
<th>IAP H₂O instantly after surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>open preperitoneal inguinal hernioplasty</td>
<td>SA</td>
<td>2</td>
<td>10-12</td>
</tr>
<tr>
<td>open preperitoneal incisional hernioplasty</td>
<td>ETN</td>
<td>2</td>
<td>4-6</td>
</tr>
<tr>
<td>open preperitoneal recti muscle hernioplasty</td>
<td>ETN</td>
<td>2</td>
<td>12-20</td>
</tr>
<tr>
<td>lower anterior rectum resection</td>
<td>ETN</td>
<td>2</td>
<td>7-11</td>
</tr>
<tr>
<td>hemicolectomy</td>
<td>ETN</td>
<td>3</td>
<td>5-6</td>
</tr>
<tr>
<td>ileo duodenoplasty</td>
<td>ETN</td>
<td>3</td>
<td>22-28</td>
</tr>
<tr>
<td>hepaticocholedochus resection, biepaticojejunostomy</td>
<td>ETN</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>pancreatoduodenal resection</td>
<td>ETN</td>
<td>2</td>
<td>20-23</td>
</tr>
<tr>
<td>alloteresoplastics, vaginolifting</td>
<td>ETN</td>
<td>2</td>
<td>10-12</td>
</tr>
<tr>
<td>ileostomy closure</td>
<td>ETN</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>laparoscopic cholecystectomy</td>
<td>ETN</td>
<td>5</td>
<td>2-4</td>
</tr>
</tbody>
</table>

'Spinal anesthesia; "Endotracheal narcosis

Some researchers assumed that patients with low abdominal wall compliance are most likely to develop ACS [4]. While we do not find any direct connection of IAP to surgery volume. Our investigation didn’t reveal any interconnection between different characteristics of intraabdominal surgery and IAP. Moreover, some of data suggested even contradictory claims.

We can take it as granted that pressure created by gas pumping into abdominal cavity at the time of
laparoscopic surgery, and displayed on insufflator manometer is the real IAP. As to the aim of our investigation it is critically important accentuate that in all patients operated in laparoscopic way IAP measured through intrabladde catheter was 7-11 cm H$_2$O lower than those on insufflator manometer. Such significant difference with clear siding toward lower intrabladde pressure than real IAP, estimated by direct measurement, gave solid base to assertion of principal difference between those two methods of testing. And with the acceptance of this presumption it is natural to consider intrabladde pressure as indicator of own bladder wall muscle tone.

But this assumption required further thorough investigation of connection between main controllers of bladder muscle tone and those factors which are in charge of leading driving force of human organism.

**Conclusions**

IAP assay via urinary bladder pressure estimating is not the IAP measurement but indicator of urinary bladder tone.

As high IAP in many cases correspond to patient’s grave condition and even death it is of importance to study the real reason of this indicator.

**REFERENCES**


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ІНТРААБДОМІНАЛЬНОЇ
ХІРУРГІЇ НА
ВНУТРІШНЬОЧЕРЕВНИЙ
ТИСК
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Реферат. Визначення проблеми. Внутрішньочеревна гіпертензія (ВЧГ) визнана як важливий наслідок оперативного втручання на черевній стінці та внутрішньочеревних органах. На жаль, відсутні ознаки прогнозу виникнення такого ускладнення.

Мета дослідження: визначити зміни внутрішньочеревного тиску (ВЧТ) в наслідок виконання абдомінальної хірургії.

Матеріал та методи. ВЧТ вимірювали у 15 пацієнтів до, безпосередньо після, а також на 1 та 3–4 добу після відкритої хірургії. Також ВЧТ виміряли у 5 пацієнтів до та після лапароскопічної хірургії.

ВЧТ вимірювали через сечовий міхур.

Результати та дискусія. До виконання операції ВЧТ становив 10 см Н₂О або вище, але не перевищував 15 см Н₂О у 3 пацієнтів.

Не виявлений безпосередній зв'язок між величиною ВЧТ та діагнозом. У 2 пацієнтів з великою післяоперативною вентральною гріжею та дефектом черевної стінки 243 см² та 832 см² ВЧТ становив 3 та 14 см Н₂О відповідно, хоча в останньому спостереженні не було жодного стиснення органів черевної порожнини.

Не встановлений зв’язок між видом анестезії та величиною ВЧТ.

Безпосередньо після операції ВЧТ становив 10 см Н₂О або вище у 13 пацієнтів, з них у 4 — 20 см Н₂О та вище. На наступний день після операції ВЧТ дорівнював 10 см Н₂О або вище у 7 пацієнтів, з них у 3 — 20 см Н₂О або вище. З останніх пацієнтів один вмер, всі інші пацієнти вижили.

У всіх пацієнтів, оперованих лапароскопічно, ВЧТ, виміряний через сечовий катетер, був на 7–11 см Н₂О нижче, ніж за показаннями манометра інсуффлятора.

Висновки. Величина ВЧТ, визначена через сечовий катетер, відображає не показник ВЧТ, а тонус сечового міхура.

Оскільки високий рівень ВЧТ в багатьох спостереженнях поєднується з важким станом пацієнта і навіть летальним наслідком, подібне поглиблене вивчення справжнього значення цього показника.

Ключові слова: внутрішньочеревний тиск, абдомінальна хірургія