LAPAROSCOPY IN ELDERLY PATIENTS

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Summary.- OBJECTIVES: Aging of the current population is an evident fact, and the surgical treatment of these patients is something we find in our daily practice. In this sense, all doubts that may arise when it comes to carrying out this technique in patients with important comorbidities appear to be cleared, as even patients with prior respiratory or heart disease benefit from the laparoscopic approach.

METHODS: An analysis was carried out on a total of 99 patients over 70 years of age who underwent renal laparoscopic surgery, compared, on one hand, to 173 patients under 70 years of age undergoing the same procedure, and on the other, to 95 patients over 70 years of age who underwent open surgery.

We collected and compared all complications described intraoperatively and in the immediate postoperative period, as well as hospital stay.

RESULTS: Patients over 70 years of age have a greater comorbidity compared to patients under 70 (ICH 1.46 vs. 0.89 p<0.05), but there are no statistical differences in terms of intraoperative or postoperative complications, or mean hospital stay.

When compared to patients over 70 years of age with a similar comorbidity who underwent classic surgery, (ICH 1.46 vs. 1.45), we found a lower rate of complications (12.2 vs. 28.4% transfusion, 1.4 vs. 4.0% fever, p<0.05) and a shorter hospital stay (4.9 vs. 7.1% p<0.002).

CONCLUSION: Patient age does not seem to have a determining effect on complications or on the postoperative period of kidney disease when laparoscopy is used, which is why this method of treatment seems adequate in such cases.

Keywords: Renal laparoscopy. Elderly. Renal surgery.

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Resumen.- OBJETIVO: El envejecimiento de la población actual es un hecho evidente y el tratamiento quirúrgico de estos pacientes es una situación que nos encontramos en nuestro ejercicio habitual. En este sentido, las dudas que nos puede surgir en realizar esta técnica en enfermos con importante comorbilidad parecen despejarse, ya que incluso en pacientes con patología respiratoria o cardiológica previa se benefician del abordaje laparoscópico.

MÉTODOS: Se analiza un total de 99 pacientes mayores de 70 años operados por laparoscopia renal comparados por una parte a los 173 menores de 70 años sometidos a la misma técnica y por otra parte a los 95
A. Aguilera, S. Pérez, J. Díez, et al.

INTRODUCTION

The mean age of the Spanish population has increased over the past few years, going from 33.2 years in 1975 to 40.8 in 2008, with an increased life expectancy of one year per five-year period since 1975, and is currently estimated at 81.2 years (84.3 in women, 78.2 in men) (1). This demographic change has influenced the type of patients we see in general practice and that we treat in the operating room. Hence, there are ever more elderly patients who thus have more comorbidities and require surgical interventions.

Laparoscopy was applied for the first time in kidney disease in 1991, by Clayman (2). Since then, there have been several studies showing the advantages of this technique compared to the classic approach, mainly in terms of less postoperative pain, lower hospital stay and faster return to the patient’s normal life (3-6). Over the course of time and with the greater aging of the population, this technique is starting to be used with the oldest patients, with diverse results, finding the first reference in 1998 (7-9).

The aim of this study is to compare the complications both intraoperative and postoperative in laparoscopic renal surgery undergone in two groups of patients; patients over 70 years old and patients under 70 years old. The surgical techniques analyzed include RN, SN and NPU (Radical Nephrectomy, Simple Nephrectomy and Nephroureterectomy). In a second analysis, the same variables will be compared but between those patients over 70 years old who underwent an open surgery and those who underwent a laparoscopic surgery.

MATERIAL AND METHODS

The period studied ranges from January, 1997 to January, 2011. Kidney surgeries (radical, simple and nephroureterectomies) carried out laparoscopically took place between June 2004 and January 2011. In this period, a total of 272 interventions were carried out (165 radical, 43 simple, 64 nephroureterectomies), of which, 99 were patients over 70 years of age. Table I. All of these interventions were carried out using a transperitoneal approach.

Patients undergoing this type of surgery with the classic approach corresponded to the period ranging from January, 1997 to June, 2004. Radical nephrectomies carried out due to a kidney tumor with vena cava thrombus and simple nephrectomies due to xanthogranulomatous pyelonephritis were excluded, as we considered these situations an absolute or relative contraindication to laparoscopy. The total number of patients operated with this technique is 201 of which, 95 were older than 70 years of age (Table I).

The groups of patients we finally studied were the 99 patients over 70 years of age who underwent laparoscopic surgery compared, on the one hand, to 173 patients younger than 70 years of age who underwent the same technique, and on the other, to 95 patients over 70 years of age who underwent open surgery. As expression of comorbidity we use the Charlson index (10) and the American Association of Anesthesiology index risk (ASA).

We collected and compared the complications described intraoperatively and in the immediate postoperative period with Clavien Classification (11) and the hospital stay. They were 13 variables in total: organ injury, transfusion, exitus, reconversion to open surgery, cardiac disorders, respiratory, renal, gastric disease, pain, fever, postoperative exploration, shock.

The statistical study corresponds to a retrospective descriptive analysis carried out by means of the statistical program SPSS 9. The description of the qualitative data is done in the form
LAPAROSCOPY IN ELDERLY PATIENTS

of absolute frequencies and percentages, while that of the quantitative data is done with the mean, the median and the standard deviation, depending on the distribution of the data. The association of qualitative variables was analyzed using the chi-square test or Fisher’s exact test, and the association of quantitative variables in two groups was analyzed with a non-parametric test due to the number of cases, Mann-Whitney’s U test. All statistical tests were considered bilateral, and p<0.05 was considered significant.

The variables included in this study are age, body mass index (BMI), anesthesia risk (ASA index), medical history (hypertension, diabetes mellitus, acute myocardial infarction, respiratory, renal, liver, gastric, and viral disease, human immunodeficiency virus, coagulation disorders, cardiac rhythm disorders), a history of abdominal surgery and recorded medical and surgical complications.

RESULTS

Table II shows the description of the characteristics of the 3 groups studied and table 3 shows the complications of each one of them, following Clavien classification.

In the laparoscopic group of patients over 70 years. Hypertension is the most frequent comorbidity observed (64.6%). Among the postoperative complications experienced, the need for transfusion (Grade II Clavien classification) is the most frequent complication (12.2%). The rate of reconversion to open surgery is 2%. Mean hospital stay is 3.4 days (2.3-30).

In the group of patients under 70 years of age operated by laparoscopy hypertension is the most frequent illness reported in the medical history (33%). The most frequent postoperative complication is, once again, the need for transfusion (7.3%). The rate of reconversion is 1.7%. Mean hospital stay is 4.1 days (3.4-4.8).

In patients over 70 years of age who underwent an open technique, the most frequent illness in medical history is hypertension (60%). Once again, the most frequent postoperative complication here is the need for transfusion, with a rate of 28.4%. Mean hospital stay is 7.12 days (2-38).

When we carried out the statistical analysis between patients over 70 years of age and those under 70, both operated laparoscopically, we found a statistically significant difference in the Charlson index (p<0.005). No differences are shown in terms of intraoperative complications (1% vs. 1.7%), with a similar rate of reconversion to open surgery (4.1% vs.

TABLE I. OPEN AND LAPAROSCOPIC SURGERIES.

<table>
<thead>
<tr>
<th></th>
<th>Open</th>
<th>Laparoscopic</th>
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<tbody>
<tr>
<td></td>
<td>RN</td>
<td>SN</td>
</tr>
<tr>
<td>&lt; 70 years</td>
<td>86</td>
<td>19</td>
</tr>
<tr>
<td>&gt; 70 years</td>
<td>48</td>
<td>4</td>
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RN: radical nephrectomy, SN: simple nephrectomy, NFU: nephroureterectomy.

TABLE II. SERIE DESCRIPTION.

<table>
<thead>
<tr>
<th></th>
<th>Age (years)</th>
<th>BMI (kg/m2)</th>
<th>Previous surgery %</th>
<th>CHI</th>
<th>ASA &gt; 3 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 70 lap</td>
<td>75,15 (70-85)</td>
<td>27,74 (18-42)</td>
<td>49,5</td>
<td>1,46 (0-7)</td>
<td>48,5</td>
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<tr>
<td>&lt; 70 lap</td>
<td>52 (16-59)</td>
<td>27,1 (18-44)</td>
<td>42,8</td>
<td>0,89 (0-10)</td>
<td>23,1</td>
</tr>
<tr>
<td>&gt; 70 open</td>
<td>74,3 (70-85)</td>
<td>27,4 (22-40)</td>
<td>45</td>
<td>1,45 (0-8)</td>
<td>45</td>
</tr>
</tbody>
</table>

BMI: body mass index, CHI: Charlson index.
1.7%). With regard to postoperative complications, no statistically significant differences are observed between the two groups (renal, gastrointestinal, respiratory, cardiology, or abdominal-wall complications, pain, fever, transfusions). Postoperative surgical exploration (Grade IIIb Clavien classification), although more frequent in elderly patients (2.5% vs. 1.7%), is not significant. No statistical differences are shown in mean hospital stay (4.9 vs. 4.1).

In the analysis between the elderly population operated laparoscopically and the elderly population operated by open surgery, we find no statistical differences in terms of comorbidity (Charlson index 1.46 vs. 1.45). We find no differences in the intraoperative complications either (1.4% vs. 4.4%). In the immediate postoperative period, we find statistical differences regarding fever (Grade I Clavien classification) (1.4% vs. 4.9% p<0.05) and transfusion (12.2% vs. 28.4% p<0.05). We find no differences between both groups for the rest of the complications. The rate of postoperative exploration is similar (2.5% vs. 1.9%). Postoperative stay is statistically significant (4.9 vs. 7.1 p<0.002).

**DISCUSSION**

Elderly patients are characterized by a greater comorbidity (cardiac, respiratory, renal, metabolic, etc.), which makes their therapeutic management, especially their surgical management, more complex (12). In this context, the laparoscopic approach entails a clear advantage compared to the open technique in terms of a lower postoperative pain with a lower requirement of analgesia, a faster oral intake and a lower rate of abdominal wall complications. However, carrying out a laparoscopy implies a series of changes in the patient’s physiology, particularly due to the generation of pneumoperitoneum, mainly in the cardiovascular and respiratory systems, causing a situation similar to that of heart failure due to an increased pulmonary and peripheral resistance. These changes can influence the patient’s postoperative period, especially in elderly patients, due to their lower capacity for recovery (13).

In this study, we wanted to compare the laparoscopic series between patients older and younger than 70 years of age, expecting to find a statistically significant difference in terms of personal history, but without finding any differences in intraoperative and postoperative complications. Indeed, these are patients with a higher comorbidity, yet postoperative results are not influenced by this. Both the figures of the Charlson index and those of the distribution of anesthesia risks according to the American Society of Anesthesiology (ASA) were significant, with 48.5% of the patients with an ASA index >3, compared to 23.1% in young patients and a Charlson index of 1.46 vs. 0.89 (p<0.05). Although the Charlson index has its deficiencies and has been criticized since its appearance in 1987, we found it to be slightly more objective than the ASA, and more easily applicable. As for intraoperative data, we found a significant difference in surgical times in favor of younger patients (146 vs. 133 min, p <0.03), and found no differences in the rest of the parameters studied (complications, conversion rate, exitus). History of previous abdominal surgery, although somewhat more frequent in elderly patients (49.5 vs. 42.8%), is however not significant. We did not find any statistical differences either in the postoperative complications between the two groups, the rate of transfusion being more frequent in both cases, which is a constant in kidney surgery. Finally, hospital stay has been similar in both populations. All these data indicate the usefulness of laparoscopy in elderly patients, the results of which are not very different when applied in patients who are younger and hence, have a lower comorbidity.

Among the most recent articles, the one by Guzzo et al., of 2009 (14), has the longest series with eighty-year-olds (a total of 51) with a different analysis, as it also studies partial kidney surgery, which we did not want to include as it is a very different surgery from the rest of the techniques analyzed, with

<table>
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<th>TABLE III. CLAVIEN CLASSIFICATION COMPLICATIONS.</th>
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<td>&gt;70 lap</td>
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<td>&lt; 70 lap</td>
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<td>&gt; 70 open</td>
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...[Table continued]...
very characteristic complications, such as urinary fistulae. It was precisely this technique the one that presented with a greater rate of complications (29%). In this article, patients are classified according to the Charlson index into above or below 2. The study also focuses on analyzing each one of the techniques separately, something that we did not want to do in our study, as the statistical analysis would lose some of its power. The final conclusion supports the idea that laparoscopy does not result into a greater number of complications or a longer hospital stay in elderly patients. Statistically significant differences are found in patients with a Charlson index above 3, regardless of their age.

In the 2003 study by Gill’s group (15), a total of 399 surgeries are analyzed, including adrenalectomies and partial nephrectomies, with the age cut-off point at 65 years. Aside from analyzing age, the study population is divided according to the comorbidity index and the ASA index into above or below 3. In this case, no statistical differences were found in the Charlson index between both age groups, but they were found in terms of the ASA index. In the analysis of intraoperative complications, age does not seem to be associated to them, or in postoperative complications. Statistical differences are found in those patients with a comorbidity index above 3, regardless of their age, in which the rate of complications is higher. Significant differences in the number of days of hospital stay were also evident between those older and younger than 65 years, being somewhat more extensive in the older group (19 hours more).

In the second analysis that we put forward (to compare patients over 70 years of age who underwent laparoscopy with those over 70 who were intervened with the open technique), we sought to study the effect of laparoscopy on a similar population in terms of comorbidity, as we believe it can provide us with information on the effect laparoscopy has in this type of patients. Indeed, comorbidity rates are similar in both groups (ICH 1.46 vs. 1.45), as is the ASA index >3 (48.5% vs. 45%), and both have a similar history of abdominal surgery (49.5% vs. 45%). The results are not statistically significant in the analysis of intraoperative complications (1% vs. 4.2%), deaths (1% vs. 0.5%) or postoperative explorations (4.1% vs. 3.2%). As for postoperative complications, we found significant differences in the rate of transfusion, being more frequent in open surgery (12.2% vs. 28.4%, p<0.05) and in fever (1% vs. 7.4% p<0.05). Normally, the transfusion rate in laparoscopy is lower; this is probably due, on one hand, to the effect of the pneumoperitoneum on venous bleeding, and on the other, to a better visualization and dissection of vascular structures. The fact that postoperative fever is more frequent in open surgery is probably due to the greater, albeit not significant, percentage of abdominal-wall complications. Oral intake is carried out in 95% of the cases on the first day in laparoscopic patients, being of 75% with the classic technique. The rest of the complications were all more frequent with the open technique, but without any statistical significance. The hospital stay was shorter in patients undergoing laparoscopy (4.9 vs. 7.1 days p<0.002). As for postoperative pain, we were unable to carry out the comparison, as usually patients who underwent open surgery had spinal catheter anesthesia for pain control in the immediate postoperative period, compared to the oral or intravenous pain control used in patients who underwent laparoscopy.

The laparoscopic interventions have been performed mostly by the same surgeon, while the open surgery interventions have been performed by at least 6 different surgeons, which could be a slant in the study.

Another limitation of our work it is due to the postoperative pain evaluation as we have previously mentioned, which prevents us from drawing conclusions in this section. Referring to the comorbidity description by the Charlson index or the ASA index, we found that occasionally the correlation between them is not good enough, though this would be the cause of another study.

CONCLUSIONS

In this study, we were unable to find any differences in the complications or postoperative period in elderly patients undergoing laparoscopic surgery, in spite of having a greater comorbidity. The effect of the pneumoperitoneum and the changes it produces at the cardiovascular and respiratory systems does not seem to have any important consequences in this type of patients.
REFERENCES AND RECOMMENDED READINGS
(*of special interest, **of outstanding interest)

1. Instituto Nacional de Estadística 2010.