

# Experience at university hospital of abdominal perineal surgery with lithotomy versus prone position

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## Introduction

Since Miles' descriptions of rectal resections for cancer,<sup>1</sup> locoregional recurrence is undoubtedly the main evolutionary complication of this surgery. This is clearly related to a poor oncologic prognosis and to a poor quality of survival. Recurrence is generally conditioned by insufficient lateral dissection at the level of the pelvic and perineal rectum.

Abdominoperineal resection (APR) compared to anterior resection results in a higher rate of circumferential resection margin infiltration (CRM), a higher rate of iatrogenic tumor perforation, and poorer mesorectal quality. These poorer results may be due to excessive dissection between the distal mesorectum and the levator ani plane and the resulting "cone" effect on the specimen. A wider excision of the pelvic floor muscles, known as extra-elevator abdominoperineal resection (ELAPE), would provide a "cylindrical" specimen that would hypothetically reduce the risk of tumor perforation and infiltration of the CRM and the local recurrence rate.

However, there is insufficient evidence to conclude that ELAPE is oncologically superior compared to standard abdominoperineal resection. Regardless of the surgical technique adopted, another current point of discussion is the position of the patient during the perineal part of the operation. Prone and lithotomy positions are the two main positions currently used in APR. The prone position provides excellent pelvic exposure, top-down dissection under direct vision and is very comfortable for the operating surgeons. However, there is no clear scientific evidence of the superiority of prone ELAPE over supine ELAPE in terms of oncologic outcomes, morbidity and mortality.

Laparoscopy seems to be the best surgical approach for the abdominal part of the operation, although so far it has not been validated by large prospective studies. Randomized controlled trials are needed to solve all these problems. The current interest in more precise and standardized perineal surgery to obtain a cylindrical part will undoubtedly improve outcomes. The aim of this article is to report the experience obtained in our center regarding prone versus dorsal decubitus resection.

## Materials and methods

A retrospective, observational and descriptive study was conducted from January 2018 to December 2022. All patients undergoing abdomino-perineal amputation, operated by members of the staff of the acting service (Surgical Clinic A) were included.

The information was obtained from the database of the operative description system of the centers involved (CASMU IAMPP, INCA and HOSPITAL DE CLINICAS), generating a registration form with the variables of interest for our study. Among them we highlight age, sex, staging at the beginning, neoadjuvant treatment and response to it.

Approach performed, surgical time and postoperative complications. Some variables were crossed with the surgical specimen (quality of resection of the mesorectum) to establish if there is a relationship between the surgical result and the position for the selected approach.

### Inclusion and exclusion criteria were established.

#### Inclusion criteria:

- Patients over 18 years of age
- Procedure performed: perineal abdomino-abdominal amputation
- Operated by service staff members
- Diagnosis of adenocarcinoma of the lower rectum

#### Exclusion criteria:

- Patients with incomplete data
- Absence of a complete postoperative pathology report.
- Those who do not meet the inclusion criteria

Pre-surgical evaluation and staging were performed by physical and laboratory examinations, including nutritional status, digital rectal examination, proctoscopy, distance of the tumor from the dentate line, colonoscopy, serum carcinoembryonic antigen (CEA) levels, chest X-ray, chest computed tomography (CT), abdominal and pelvic CT, endorectal ultrasound and/or pelvic magnetic resonance imaging (MRI).

## Statistical analysis

A frequency table was used to describe qualitative variables and a mean with standard deviation for continuous variables, after

checking normality with the Kolmogorov-Smirnov test. The study of association between variables was performed with Fisher's test (chi-square correction) and the comparison of continuous variables between groups with Student's t-test for independent samples. The significance level was set at  $\alpha = 0.05$ . The statistical software used was STATA v.17.0.

## Results

Thirty-three abdomino-perineal resections (APR) were performed in the aforementioned centers during the established period. One case was excluded because it was a squamous cell carcinoma of the anus

and the remaining cases were adenocarcinomas of the lower rectum. Of the total number of patients included in the study ( $N=32$ ) 23 were male (71.8%) and 9 female (28.1%). The average age was 71 years with a maximum of 86 and a minimum of 55 years. Regarding patient position, 15 were performed in decubitus (46.9%) and 17 in prone (53.1%). The characteristics of each group (prone and decubitus) and their establishment as comparable populations are described in Table 1.

The characteristics of the surgical procedure are shown in Table 2, with no statistically significant differences between the two approaches and the quality of the specimen.

**Table 1** Description of the general population and by groups

General Characteristics	Total Population	Prono Group	Decubito Group	P Value
Sex: F/M	11/21	7/10	4/11	0,388
Age (years)	71,5 +/- 1,5	72,8 +/- 1,4	68,4 +/- 3,8	0,195
Pathological anatomy:				
Rectal adenocarcinoma	31	16	15	0,340
With signet ring cells	1	1	--	
T:				
2	5	3	6	0,129
3	21	11	9	
4	6	3	--	
N*:				
0	17	6	7	0,022
1	8	4	7	
2	7	7	--	
Response:				
Complete	3	2	1	0,546
Incomplete	5	4	1	
Partial	7	6	1	
Poor	8	4	4	

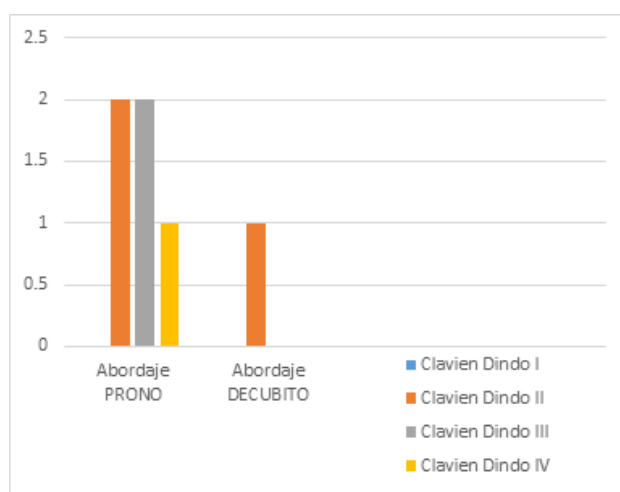
\*: data is missing for a patient

**Table 2** Surgery characteristics

	Total Population	Prono Group	Decubito Group	P Value
Surgical time (minutes)	244,4 +/- 13,9	257,5 +/- 16,9	210,4 +/- 19,1	0,134
Proximal margin (mm)	83,0 +/- 7,8	73,5 +/- 7,4	105,0 +/- 17,1	0,061
Distal margin (mm)	37,8 +/- 2,9	38,4 +/- 3,3	36,0 +/- 6,7	0,736
Anterior radial margin (mm)	4,3 +/- 0,5	4,8 +/- 0,4	3,0 +/- 1,2	0,085
Posterior radial margin (mm)	3,1 +/- 0,4	3,4 +/- 0,4	1,0	-----
Circumferential integrity:				
Complete	26	14	12	0,087
Incomplete or partially complete	6	3	3	

The placement of a single flap was observed in a patient with prone position, which corresponded to VRAM. Only one patient presented recurrence after surgery, this patient corresponded to the decubitus group,  $p$ -value = 0.292. 6 patients presented complications, 4 in the prone group and 1 in the decubitus group. According to Clavien Dindo's classification they are divided into (Graph 1):

- In the prone group: 1 case of infection/reintervention, 2 small bowel occlusions and 1 colostomy prolapse with reoperation for adhesion small bowel occlusion.
- In the decubitus group, one patient with infection was observed.
- Only one patient died, he belonged to the prone group,  $p$ -value = 0.708.



**Graph I** Complications according to Clavien-Dindo.

## Discussion

Reducing locoregional recurrence is undoubtedly the greatest challenge for the operating surgeon, from Miles to the present day, including Heald with the introduction of the concept of total mesorectal resection, in addition to neoadjuvant treatment; the concern is focused on achieving a better resection and a lower risk of relapse or persistence of the disease.

It is well known that abdomino-perineal resection surgery (APR) associates (in relation to patients submitted to low anterior resection) compromised lateral margins due to the well known “cone effect”. Some authors report a higher rate of perforations and positive lateral margins especially for lesions located in the middle or lower rectum.<sup>1</sup> In 2007 Holmes et al. postulated obtaining better results through a higher quality of cylindrical resection in prone position, with section of the levator any muscles, hence the name “Abdominoperineal Extralevator Amputation”.<sup>2</sup>

Several authors have postulated the importance of this new technique, demonstrating a lower rate of local recurrence and intraoperative tumor perforation with better mesorectal resections, especially in locally advanced T3 and 4 tumors.<sup>3-5</sup> Hui-Chuan Yu in a meta-analysis highlights the positive short-term results of the extra levator versus conventional approach.<sup>6</sup> Haoyu, in a more current communication highlights that the extralevator approach significantly improved long-term survival of low rectal cancer compared to PSA, especially for patients with pT 3 and positive lymph nodes.<sup>7</sup>

Nationally, university referents propose performing an extended posterior perineal approach in the prone or jackknife position. The ischiorectal fat is dissected to a limited extent and the entire circumference of the levator muscles is exposed. They are sectioned close to their pelvic insertion, possibly using Ligasure®, and once the posterior and lateral planes have been dissected, the specimen is reversed through the perineum. This approach allows a wider and better exposed dissection of the anterior plane with the possibility of partial resection of the prostate or seminal vesicles or of the posterior wall of the vagina.<sup>8</sup>

Although we have not found much literature comparing the conventional extralevator approach (in Loyd Davies) with the prone extralevator approach, international works with small case series where favorable results are reported stand out. Manolizi in his series

reports surgical specimens with negative margins without tumor perforation.<sup>9</sup>

With regard to the present study, we emphasize that it was carried out in the university setting where residents and assistants are in constant training. On the other hand, the patients who arrive at this center are considered to be of greater complexity, both in the medical and surgical fields. This fact entails a higher risk of complications regardless of the procedure they undergo. On the plus side, the constant support of the senior staff, specialists in the field, allowed the procedures to be carried out under strict supervision and in a protocolized manner. The reported complications we believe are to be expected considering the complexity of the terrain of the patients referred to this center. Taking this into account, the results obtained have been favorable and similar to national and international reports.

## Conclusion

The prone extralevator approach is a reproducible and safe technique to be performed in a university center, with adequate supervision allowing appropriate training for the service staff. The quality of mesorectal resection does not show significant differences with respect to the conventional approach. A prospective and randomized study remains to be carried out in order to evaluate the results obtained in the long term.

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## Conflicts of interest

Authors declare that there is no conflict of interest.

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