

TYPES OF RECTAL SURGERY AND RELATED SEXUAL DYSFUNCTIONS

* Vasile NIȚESCU, ** Valentin NIȚESCU

* Medical Centre of Obstetrics-Gynecology and Sexology

**Department of Surgery, "Clinical Hospital Dr.I. Cantacuzino", Bucharest, Romania

Abstract:

The rectal pathology surgery can cause morphofunctional disorders of the genitourinary organs, at both genders, subsequent to the intra-op lesions, these manifesting as sexual dysfunctions, fact that was often notified by the patients, after the surgery.

Therefore, I consider it useful to study in detail the etiopathology of sexual dysfunctions, first of all caused by the vascular-nervous lesions occurred in the wound, which, theoretically, get out of the control of the brain, of the medullary reflex arc and of the local receptors.

The lesions caused by the surgical procedure depend on the gravity of the rectal pathology, on the septic time, on the emergency of the procedure, on the professionalism of the surgeon, on the anatomical variant of the pelvic topography and on the type of surgery.

Sexual dysfunctions caused by the sectioning of the nervous and vascular branches remain, in principle, permanent, being more serious at man, considering that copulation cannot be achieved without erection, except for pathological cases when, for example, ejaculation can occur without erection, in form of emission. If sexual dysfunctions become permanent because of the sectioning of the neurovascular elements, the question is whether these improve in time, in accordance with the information presented by the patients. In this case, theoretically, the brain stem can no longer perceive the sensations of the terminal local sensory receptors, Alpha-1 type, partly on the mucosa of the gland or vulva, which is under vegetative control, causing thus erectile dysfunction.

The reasons of the patients' coming to the sexologist, after the surgery of the rectal pathology, were caused not only by the occurring of certain types of sexual dysfunctions, but also by the inefficiency of the pharmacological preparations for sexual stimulation.

Keywords:

rectal pathology, sexual dysfunctions, specific lesions, exeresis of the rectum

Correspondence to: * Nițescu Vasile MD., Ph.D., E-mail: valnitescu@yahoo.com, Phone: +40723151804 ** Nițescu Valentin, MD, Clinical Hospital "Dr.I. Cantacuzino", 5.7 Ion Movilă Street, post code 030167 Bucharest, E-mail: valentin_nitescu@yahoo.com.

Introduction

The sigmoid colon and the rectum compose the terminal segment of the digestive tube. Unlike the sigmoid, rectum has a pelvic trajectory, in continuation of the colon from the vertebra S3, up to the anus (Fig.1.a).

Rectum is located along the curve of the sacrum and peritoneum covers it in the anterosuperior half of the rectal ampulla. Peritoneum reflects on the anterior organs, depending on gender, and laterally, if forms the pararectal recesses.



Photo: Adapted from Wyeth France

Fig. 1 a. Sagittal section through the pelvis. Rectum, the terminal segment of the digestive tract, fixed in the cuverture of the narrower sacrum- in female. Anatomical relationships with the genito-urinary organs

The haustra, ribbons and epiploic appendages disappear, therefore the musculature becomes better emphasised through the circular and longitudinal layers.

The exeresis of the pathological pelvic structures involves directly vessels, nerves, lymphatic system and adjacent tissue of the neighbouring genitalia, as follows: anteriorly, through the peritoneum (the pouch of Douglas), the urinary bladder at man, the genitalia at woman; laterally: through the latero-rectal orifices, there are the uterine appendages (tube, ovary); infraperitoneal posteriorly: the sacrum, presacral aponeurosis, which separates it from the presacral vessels and sacral plexus the roots. Between the rectum and the presacral aponeurosis, there is the retro-rectal area, cleavable at manual manoeuvre; laterally: the ureters and middle haemorrhoidal arteries; anteriorly: at man – the pouch of the bladder, seminal vesicles, deferent canals, base of the prostate. All are separated by the rectum, via a vertical area and the prostates-peritoneal aponeurosis, i.e. Denonvilliers' fascia (cleavage plan), at woman – the posterior vaginal wall. The reproductive system interposes between the bladder and the rectum, thus influencing sexuality directly, under various forms. For example, the lack of prostatic secretions, which represent 25-30% of the seminal fluid, of the seminal vesicle secretion and of the bulbourethral gland secretion, which no longer reach into the seminal fluid, reducing it thus both qualitatively and quantitatively, directly influencing fertility, because the mobility of the spermatozooids in the ejaculator duct and urethra is absent. With its rich content in vesiculosis, the prostatic fluid has a coagulant action on the semen, and, with its content in fructose and citric acid, it influences favourably

the mobility of the spermatozooids. The alkaline secretion of the prostate buffers the citric acid, not allowing it to destroy the spermatozooids, therefore influencing fertility favourably.

The perineal segment of the rectum is fixed by the anal lifting muscles (Fig.1.b), which act as a rectal sphincter next to the two anal sphincters, both external and internal. After the dissection and isolation of the rectal pathological masses, sometimes, the surgeon keeps an ending portion of the rectum, with a length of 2- 5 cm from the anal-rectal line to the pectineal line, which represent the so-called "surgical anal canal", which, in principle, keeps the two anal sphincters.

In the remaining rectal fragment, with a length of more than 5 cm, according to the oncological safety rules, colorectal anastomosis, according to most authors, offers favorable results in over 90 % of the cases, protecting normal intercourse.

In the rectal fragment less than 5 cm length, performing low colorectal anastomosis or colo-anal anastomotic surgery poses a question mark in choosing the anastomosis type that regards: the number of 24 hours defecations demands, the value of contention, the perception of the difference between the elimination of the faeces and gases, the perception of the imperative sensations of defecation, all of which can have a direct negative influence on sexual intercourse.

If the length of the remaining rectum is lower than 4-5 cm, the ileoanal anastomosis can no longer be made, because of the transit disorders, which increase the pathology of sexual dysfunctions at both genders. Depending on size, these no longer have the initial

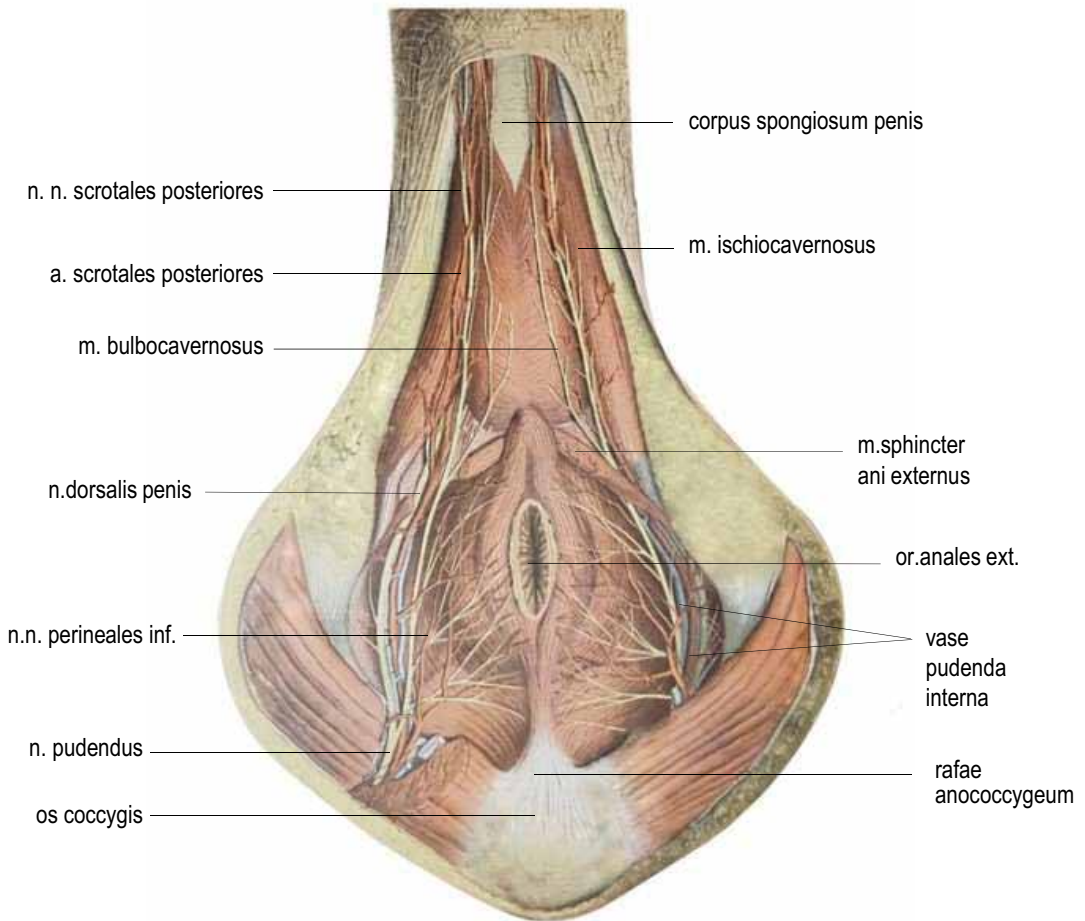


Fig. 1.b. Perineal region: arteries, veins, nerves that originate in the pelvis.

Section of the neurovascular formations that target the anus and base of the penis, the cause of penile sexual dysfunction and contractile dysfunction of the anal orifice. The surgical cutting of the nerve threads of the anal lift muscles causes rectal prolapse. The surgical cutting of the nerve threads of the anal sphincter muscles, which no longer efficiently compresses the anal walls, causes the continuous discharge of the anal glands. (Adapted from Sobotta – Figge 1963)

efficiency, however, even if the defecation sensation still exists and there is an apparent contraction of the anal orifice. Sometimes, the perception of different sensations between gas and faeces is no longer differentiated.

Also, the remaining rectal segment, similarly to the case of ultra-low rectal resection, maintains a reduced secretion, with a specific mucus and elimination, in small quantity, and with a specific smell, which cannot be controlled anymore, according to the description of the patients. Sometimes, during urination, the

anal sphincter cannot even stop the elimination of air bubbles. In several cases, the anal secretion reduced at 2.5 – 3 years after the surgical intervention.

The secretion of the remaining anal canal mucosa glands, which is deposited on the rectal ampulla (ampulla recti), in the rectal sinuses and columns (sinus rectales, columnae rectales) and next to the anal orifice (annulus haemorrhoidalis) (Fig2) requires additional local hygiene, on a daily basis, this being a particular sign in sexuality.

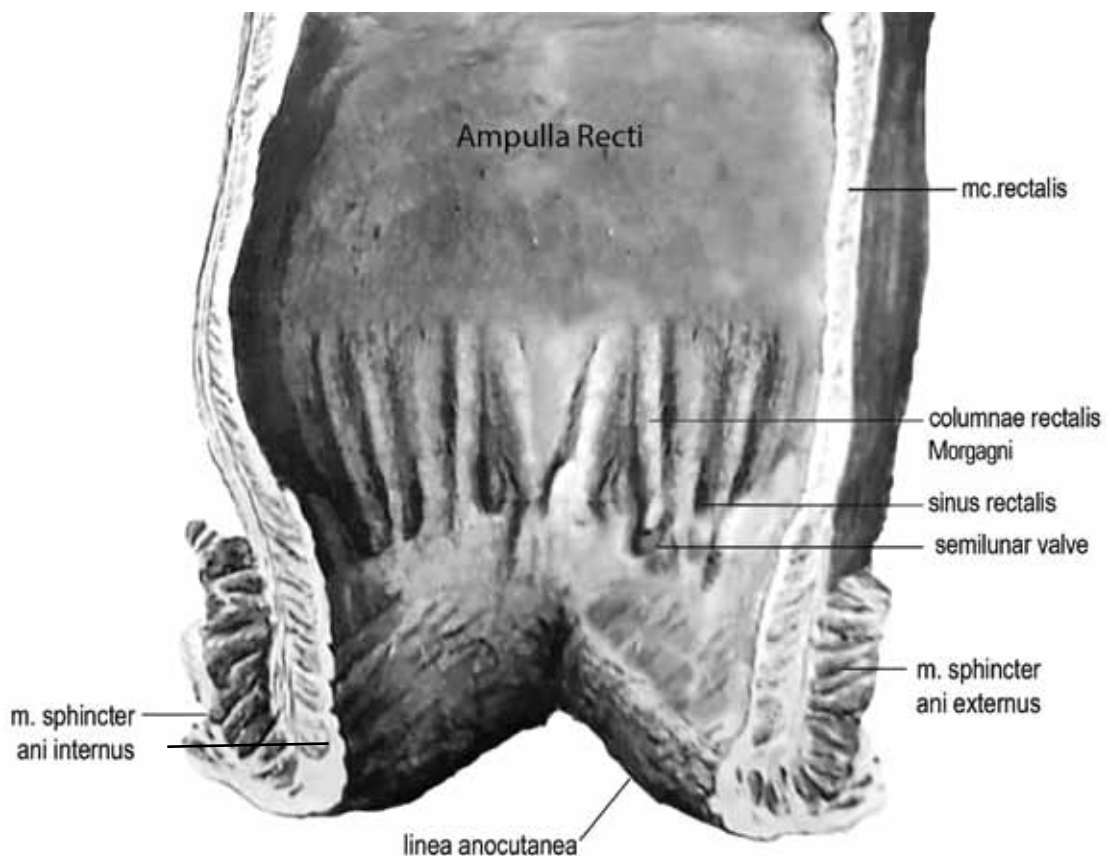


Fig.2 The remaining anal channel;

The retention area of anal glands secretion. In the biological product harvested from the anal area, in 78% of cases, on the culture media were found colonies of *Proteus mirabilis*

I mention that the sensation of rectum contraction and relaxation functions as anabolic reflexes controlled by the brain.

Sectioning the vegetative and somatic branches (Fig.3), as well as the vascular ones, not only modifies the morphophysiology of the pelvic genital organs, but also of the urinary bladder. So, in theory, the Local Nervous System is connected to the Central Nervous System (CNS), but, practically, sectioning the receptive nervous threads, these organs, in terms of functionality, are no longer sub-

ject to the brain control or treatment administered, thus justifying the sexual dysfunctions accused by the operated patients.

One conclusive example is also given by the post-op administration of type 5 phosphodiesterase inhibitors (PDE5), which not only does not stimulate the desired erection, but also causes accidents, due to the intensification of the pre-existent cardiovascular pathology, such as myocardial infarction, instable angina, ventricular rhythm problems, or cerebral ischemic vascular accidents, by

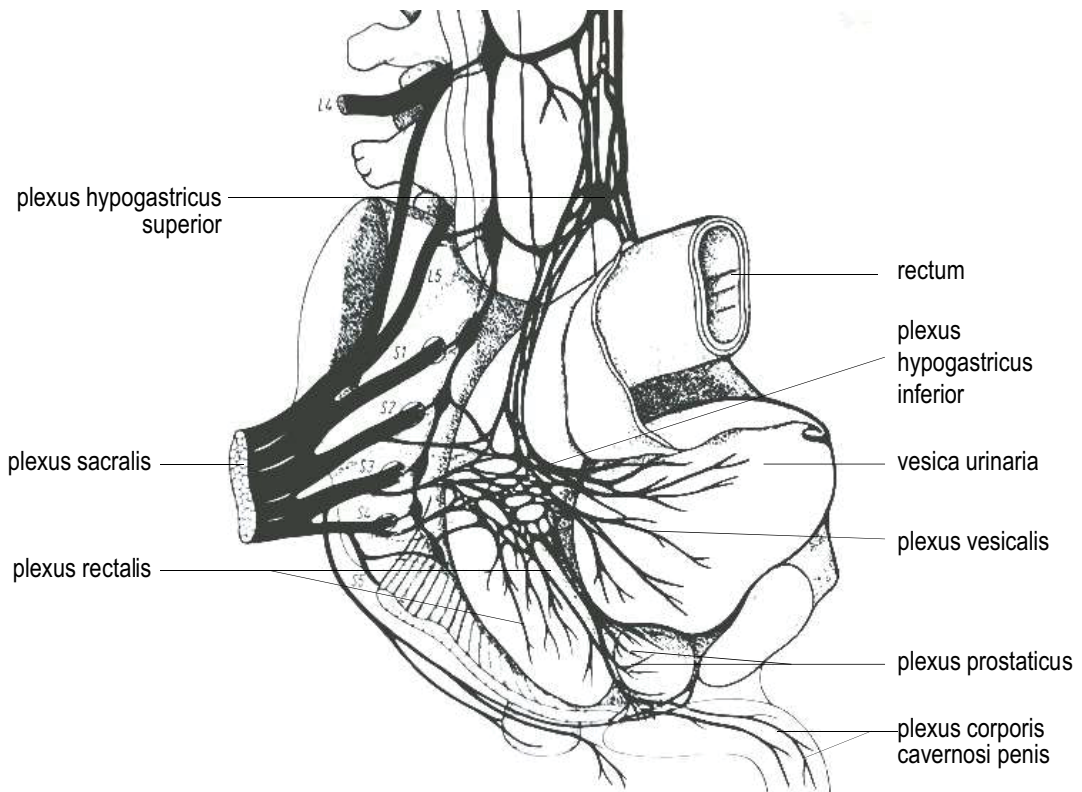


Fig. 3 The vegetative/autonomous pelvic innervation in male- schematic drawing (Adapted from Benninghoff-Goertler 1979)

the mere administration or supplementation of dosages.

In 72% of the cases in our statistics, the sectioning of the vegetative threads which involve the urinary bladder at men (Fig.4) and women (Fig.5), particularly at persons of 70- 82 years old, caused the increase of the frequency of night micturition, with low jet and several interruptions, the time for partial evacuation increasing, despite the additional effort of the abdominal muscles.

The parasympathetic vegetative fibres

have their role in the penile erection, increasing the blood flow in the cavernous bodies, and the sympathetic ones cause the emission and ejaculation of the spermatic fluid. Vasoconstriction of the penile veins influences the erection in a negative way.

The sectioning of the vascular-nervous masses no longer stimulates the seminal vesicles, respectively the elimination of the spermatic fluid, the secretion of prostate canals, of the vas deferens and the vascular elements standing at the base of the penis.

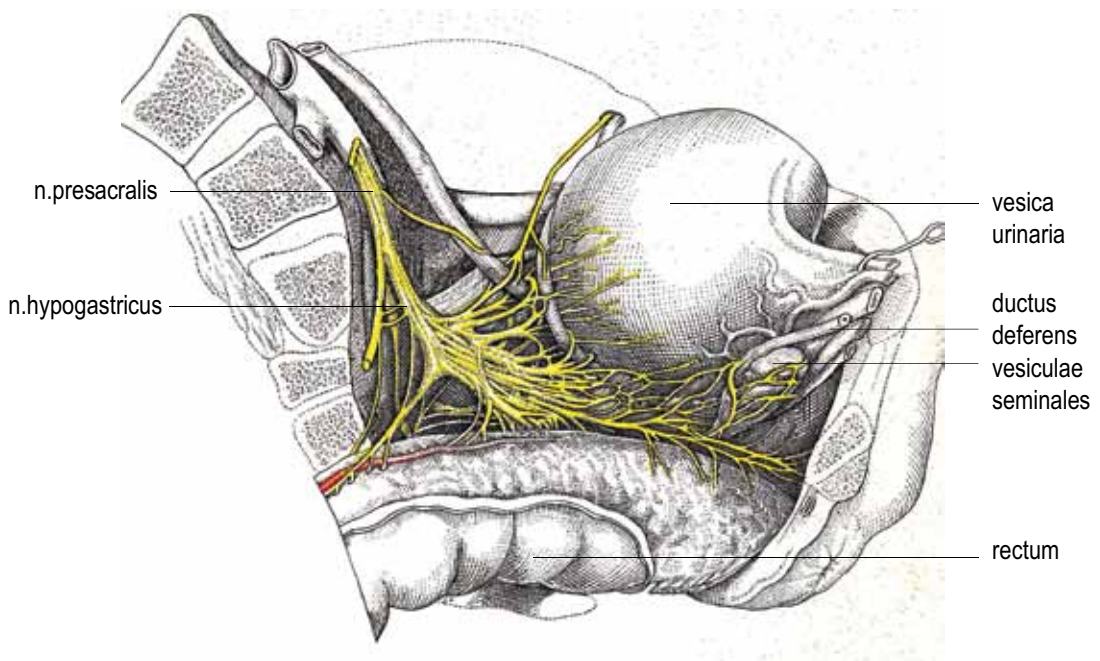


Fig. 4 Recto- vesical pelvic innervation in male (Adapted from Latarjet et Bonnet1931)

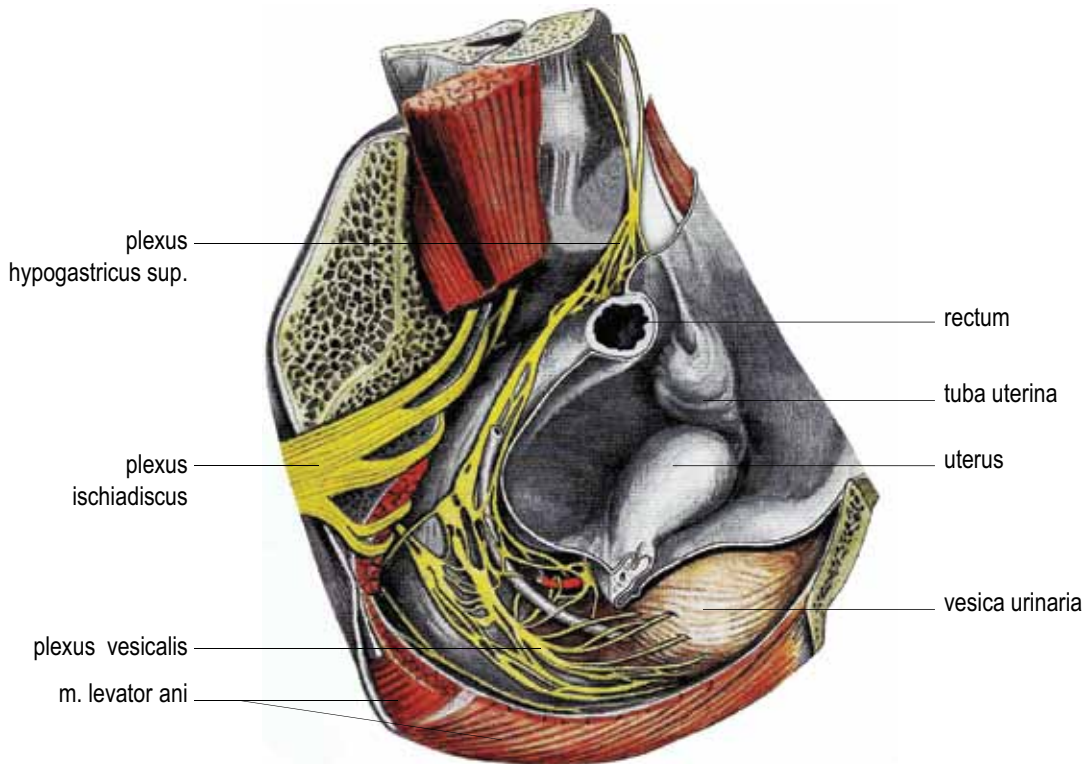


Fig. 5 The pelvic innervation in female (Adapted from Anton Hafferl 1957)

Surgical methods of the rectal pathology and sexual dysfunctions occurred

Each surgeon operates in accordance with the professional training, experience and operator preference. Choosing the type of intervention takes into account the topography of lesions and their local-regional extension, the anatomic pelvic topography (tighter, at man), the degree of obesity of the patient, the biological potential, the age, the features of the tumour (the non-differential ones present, in most cases, lymph nodes invasion).

The surgical treatment requires also a mandatory and correct, clinical, biological, imaging assessment and the determination of the anaesthetics and surgical risk.

Lower GI Endoscopic Surgery

General Data

Lower GI endoscopy represents a simple way of examination, diagnosis and treatment of the rectal pathology. The endoscopy with image amplifier and contrasting staining indigo- carmine or cresyl- violet (Fig.6 a,b,c), is efficient for diagnosing the incipient rectal pathology, determining the position of the tumour, its size, the degree of stenosis and the anatomic-pathological shape.

The rectal endoscopy can establish the degree of tumour invasion, the local-regional extension or the possibility of neighbouring lymphadenopathies. It has, however, a reduced application territory, because the surgical



Fig. 6 a, b, c Endoscopy- Different contrast staining

treatment of the benign tumours, as well as of the incipient colorectal cancer, requires a correct appreciation of the clinical, biological and imagistic diagnosis, fact that limits the endoscopic approach only at the treatment of the incipient colorectal lesions.

Singular polyps (Fig.7. a,b,c), particularly the adenomatous ones, numerous, spread or grouped in placards (Fig.8 a,b,c), after the age of 40, stand at the basis of most cancerous tumours. The type of endoscopic resection is made in relation with the extemporaneous biopsy, when the biological product is collected directly from the mass. The echo-endoscopy has an accuracy of 85% in the parietal invasion of the anal sphincter.

Among the disadvantages of endoscopy, we can mention: the impossibility of establishing accurately the degree of tissue infiltration (penetration of the intestinal wall by the pathological tissue), the lymphatic dissemination or the existence of metastases.

The incomplete excision of the tumour, using the endoscopic method, causes recurrence and the occurring of metastases. The exeresis of the higher sized-lesions causes strictures or contractions, which decrease the elasticity of the remaining tissues, modifying the local morphophysiology and can also cause, for example, intestinal occlusion with afferent repercussions. The risk of perforation is of 1/1700 colonoscopies (Bolog, Mateescu, Voiosu), in the case of endoscopic interventions.

The lesions of the neighbouring organs, in the lower GI endoscopy, occur after operatory complications (bleeding, perforation, stenosis, contraction.

Sometimes, not even the collection of the

biological product (by endoscopy) can surely establish the diagnosis of rectal cancer, like in case of infiltrative tumours or inflammatory reactions, even if there is the possibility of exfoliative brushing of the suspect areas or the needle aspiration.

Complications can occur on short of long term.

In principle, the complication-free endoscopic operation leads to minor sexual dysfunctions or does not cause sexual dysfunctions at all. Minimum dysfunctions however can be aggravated by some complications, the pre-existence of chronic diseases or accentuated consumptive diseases, which, among others, depress the gonadotropic system, causing sexual dysfunctions.

According to some authors, the conservatory operations or only surgically treated patients lead, in 50% of the cases, to local recurrences, in principle approximately five years later, the occurring of malignant pathology requiring a laparotomy and rectal colotomy. In the rectal polyposis (Fig.8 a,b,c), as shown above, not only there is a major risk of neoplastic degeneration, but also a risk of mortality in the first ten years. Minimally invasive surgery has proven its efficiency in the treatment of well-determined rectal lesions, and the lesions of the neighbouring organs are minimal, except for the incidents and accidents. Some authors claim that the colonoscopy provides a good yield in the diagnosis of the colorectal neoplasia only after the age of 50 years old.

The patient can leave the hospital immediately or after one or two days, and the sexual activity can be resumed in accordance with the sexual potency existing before the intervention.

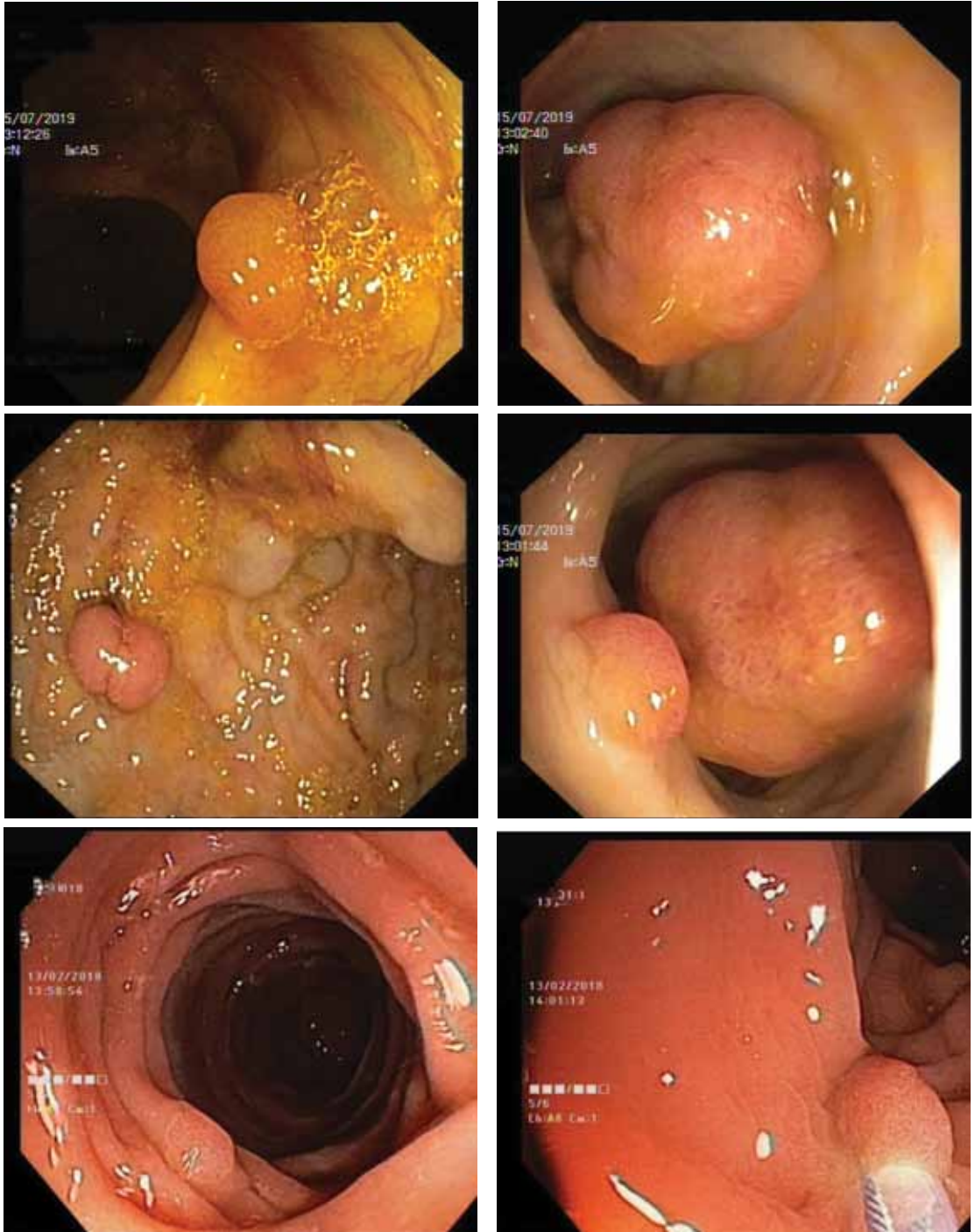


Fig. 7 a, b, c Singular rectal polyps. Endoscopic resection with extemporaneous biopsy.



Fig. 8 a

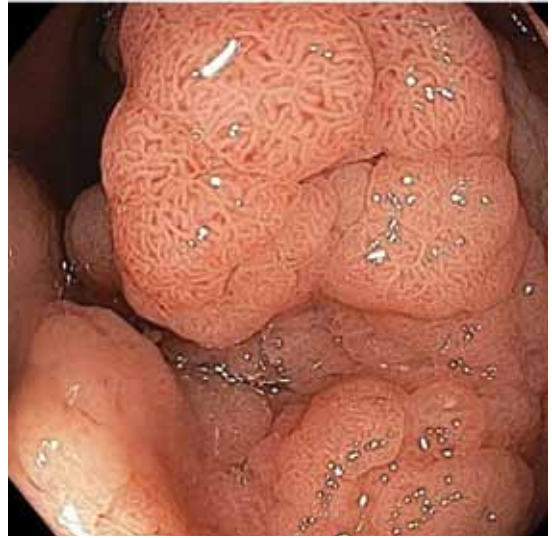


Fig.8 b



Fig. 8 c

Fig.8 a, b, c Polyps in placards. **a.** Lateral spreading tumor without stenosis. **b.** Vegetation formation polylobate without NBI, partially stenose. **c.** Lateral spreading tumor

Laparoscopic and Robotic Surgery

The enlarged three-dimension images, the very precise movements of the micro-instruments introduced in the abdomen through tiny incisions, allow the entrance in a very reduced area, such as the curve of sacrum at men, and the performance of dissection and exeresis of rectum, by laparoscopy. Used inclusively in the rectal oncologic pathology, it provides the preservation of the upper vascular-nervous masses, thus protecting best the neurovascular elements involved in the occurrence of the sexual dysfunctions.

Video-laparoscopic colorectal surgery has a longer duration than classical surgery, but offers many advantages such as rapid resumption of colon transit, reduced postoperative pain, infections, hospitalization and lower complications (adhesions, occlusions, eventration).

The robotic surgery, which is higher in value than the laparoscopic surgery, in terms of morbidity and mortality, is a minimally invasive treatment, with irrefutable advantages, such as: precision and control, as compared to the classical operation, respectively open abdominal surgery, post-op reduced pain and bleeding, decrease of the risk of infection, small scars, rapid social reintegration.

The high-resolution three-dimension images, in high definition, offers superior visualisation of the pelvic masses, increased precision in the dissection and fine suture of the local elements, high operating potential, low rate of post-op complications, shorter hospitalisation period, as compared to laparoscopy.

From these reasons, the laparoscopic surgery, the robotic one particularly, best pro-

fects the neurovascular masses of the organs adjacent to the rectum, and the sexual dysfunctions are significantly reduced .

In the opinion of some authors, laparoscopy and robotic surgery are valuable only due to the shorter period of operating time, but in other authors' opinion, laparoscopic or robotic surgery has a longer duration than the usual (classic) one. The intervention requires investments in performing equipment, respectively a special training programme.

Obviously better preservation of the vascular-nervous masses, using these two surgical methods, has been described by numerous authors, the advantages being unquestioned.

Open Abdominal Surgery

This remains the main form of intervention in the complex rectal pathology and in emergency cases. It is a complete way of approach and treatment, basically for the autoimmune inflammatory diseases (ulcero-haemorrhagic rectocolitis, Crohn's disease, undetermined colitis), diverticulosis complicated with diverticulitis, benign and malignant tumours, particularly in advanced stages, emergencies, very serious diseases. In the case of advanced rectal oncological pathology, the vascular-nervous lesions caused to the neighbouring organs are complex, and, because of the modification of the morphophysiological structure, the sexual dysfunctions are more severe.

The exeresis of rectum or of a portion of it which contains the tumour, the lymph nodes and the lymphatic drainage system, inclusively the lymph nodes of the last lymphatic drainage station where metastases may occur, (of 2-17 %), respectively the pararectal vascular-nervous masses, require, among others, the primitive ligature of the vascular pedicles,

in order to prevent the neoplastic dissemination during the intervention and the ligation of the primary vascular pedicles of the rectum, influencing directly the irrigation of the adjacent genital organs, thus causing changes in their morphophysiology, respectively occurrence of sexual dysfunctions.

Sexual dysfunctions are even more severe at the moment of removing one of the genital organs, such as prostate or ovaries (prophylactic bilateral ovariectomy, usually during the pre-menopause, when this depresses even more the specific hormonal deficit).

As for the adherences of the tumour at the neighbouring pelvic organs, in 66% of the cases – to the opinion of Mc Glone TP and collab.– the entire resection of the tumour and of the respective organs should be made, the secondary lesions of the adjacent organs being larger and the sexual dysfunctions being more severe.

In the open surgery, as well, an important part in maintaining the normal morphophysiology of the urinary genital organs, thus avoiding the sexual dysfunctions, is played by the professional training and the experience of the surgeon, the anatomical modifications of the pelvic organs, the rectal pathology, the type of the tumour mass (differentiated or undifferentiated, with severe lymph node invasion and reserved prognosis), the need of chemotherapy or the existence of liver and/or lung metastases.

The variants presented above explain, in case of the exeresis of rectum pathology, why the scientific works give an incidence of the sexual dysfunctions with so very different values.

Conclusions

- sectioning the neurovascular elements modifies the physiology of the neighbouring organs, influencing thus the fertility of the operated persons inclusively;

- the maintenance a rectal stub from the anorectal line to the pectineal line (a segment of 2-5 cm) cannot be controlled and the secretion with particular smell and mucus disappeared not even after 2.5 -3 years, at the persons under supervision, requiring a daily special hygiene;

- sectioning the neurovascular elements causes erection dysfunctions, both at man and woman, through the section of the parasympathetic vegetative fibres, and the sectioning of the parasympathetic fibres cause the ejaculation dysfunction. Above all these, the vascular structures (arteries, veins) interfere directly;

- the ileal pouch-anal anastomosis, in the case of the rectal stub, due to intestinal transit disorders, influenced negatively the pathology of sexual dysfunctions at both genders;

- the type of surgical intervention is selected depending on the rectal pathology and the professionalism of the surgeon;

- the laparoscopic and robotic surgery provides, among others, higher precision and control as compared to the open surgery, which remains the main form of intervention in the complex rectal pathology.

References

1. Andolfi C, Umanskiy K. Appraisal and Current Considerations of Robotics in Colon and Rectal Surgery. *J Laparoendosc Adv Surg Tech* 2018;lap.2018.0571.
2. Benninghoff- Goertler, *Lehrbuch der Anatomie des Menschen*,370,1979.
3. Benoist S1, Panis Y, Boleslawski E, Hautefeuille P, Valleur P., Functional outcome after colo-anal versus low colo-rectal anastomosis for rectal carcinoma, *J.Am.Coll. Surg* 1997,185,144-119.
4. Berger A1, Turet E, Parc R, Frileux P, Hannoun L, Nordlinger B, Ratelle R, Simon R., Excision of the rectum with colonic J pouch-anal anastomosis for adenocarcinoma of the low and mid rectum, *World J.Surg* 1992,1,470-477.
5. Beuran M., Preservation of sexual function in rectal surgery, *Journal of clinical sexology*, Vol.2, No.1: January –March 2019.
6. Ciurea T.,Pascu O., Stanciu C., *Gastroenterologie și Hepatologie*, Ed. Medicală București, 2003, p. 218- 221, 227-230, 232, 282-283, 296-302, 304-325, 304-325, 334.
7. Clemente D. Carmine; *Anatomy, A Regional Atlas of the human body*, 238,1975.
8. Coculescu M., *Neurologie Clinică*, Ed.Științifică și Enciclopedică, București,1986, p.248-256.
9. Georgescu I., Popescu I., Surlin V.: *Gastrologie și Hepatologie, Actualități, tratamentul chirurgical al cancerului colo-rectal*, Ed. Medicală, 2003, p.296-302.
10. Graf W, Ekström K, Glimelius B, Pahlman L., A pilot study of factors influencing bowel function after colorectal anastomosis. *Dis colon rectum* 199,39,744-749.
11. Guyton A., John E.Hall, *Tratat de Fiziologie a Omului*, Elsevier Saunders, ISBN (13) 978-973-87261-4-7, 2006, p. 999-1003.
12. Hafferl Anton, *Lehrbuch der Topographischen Anatomia*, 622,1957.
13. Hellan M., Anderson C., Blenham JD., Paz B.,Pigazzi A., Short term outcomes after robotic assisted total mesorectal excision for rectal cancer; *Annals of surgical oncology* 2007,10; 1245.
14. Jameson JS, Chia YW, Kamm MA, Speakman CT, Chye YH, Henry MM.Effect of age, sex and parity on anorectal function, *Br. J.Surg.*1994;81,168-1692.
15. Killing D., Chirst AD., Karaaslan N.,Al histological investigations of polyps always necessary, *endoscopy* 2001, 33, p. 428-433.
16. Mc Glone TP., Bernie WA., Elliot DW., Survival following extended operations for extracolonic invasion by colon cancer. *Arch.Surg.*1982;117;595-9.
17. Michael R.P, Ress H.D, *Life Sci* 30,2087,1982.
18. Nițescu V., *Sexologie Clinică*, Ed. Acad. Române,2009, p.90-107,277-291.
19. Nițescu V., *Treaty of Clinical Sexology*,The Publishing House of the Romanian Academy; 2018, p.87-100, 115-116,223-254.
20. Park SY, Choi G-S, Park JS, Kim HJ, Choi W-H, Ryuk JP. Robotic-assisted Transabdominal Intersphincteric Resection. *Surg Laparosc Endosc Percutan Tech* 2013;23:e5–10. doi:10.1097/SLE.0b013e318275b27a.
21. Sheridan P J.,*J.Endocr. Rev.*,4, i71, 1983.
22. Sobotta- Figge, *Atlas of Human Anatomy*, vol III, Part I, 8TH English Edition, 133, 1963.
23. Testut L, *Traité d’anatomie Humaine par Latarjet*, tome quatrieme; Paris, 522-523, 1931.
24. Wilson J D.,In:”Clinical neuroendocrinology”, Besser G.M., Martini L., (Editors), Academic press London, p.1, 1982.