REVIEW ARTICLE

Abdominal visceral pain: clinical aspect*

Dor visceral abdominal: aspectos clínicos

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ABSTRACT

BACKGROUND AND OBJECTIVES: Abdomen is the most frequent site for acute or chronic painful syndromes, for referred pain from distant structures or for pain caused by systemic injuries. Abdominal visceral pain is induced by hollow viscera or parenchymal viscera walls stretching or by peritoneal stretching. Complex diagnosis and treatment have motivated this study. Patients with chronic abdominal pain are usually undertreated and underdiagnosed. The interdisciplinary treatment aims at minimizing patients' distress, relieving pain and improving their quality of life.

CONTENTS: Since visceral diseases may determine pain of different types and, usually, challenge physicians with regard to their diagnosis and treatment, the authors have described in a practical way painful characteristics and associations with more common diseases.

CONCLUSION: The interdisciplinary treatment, with the association of pharmacological measures to physical medicine and rehabilitation procedure and to psychological follow up, decreases distress and inabilities and improves quality of life.

Keywords: Abdominal pain, Interdisciplinary treatment, Myofascial pain, Visceral pain.

RESUMO

JUSTIFICATIVA E OBJETIVOS: O abdômen é o local mais frequente das síndromes dolorosas agudas ou crônicas, de dor referida de origem em estruturas distantes ou de dor decorrente de lesões sistêmicas. A dor visceral abdominal ocorre por tensão ou estiramento da parede das vísceras ocas ou da cápsula das vísceras parenquimatosas e pela tração ou estiramento peritoneal. O diagnóstico e o tratamento complexos motivaram este estudo. Os pacientes com dor abdominal crônica usualmente são subtratados e subdiagnosticados. O tratamento interdisciplinar visa minimizar o sofrimento do paciente, aliviar a dor e melhorar sua qualidade de vida.

CONTEÚDO: Como as doenças viscerais podem determinar dores de vários tipos e, habitualmente, desafiam os médicos no seu diagnóstico e tratamento, os autores descreveram de forma prática, as características dolorosas e as associações com as doenças mais incidentes.

CONCLUSÃO: O tratamento interdisciplinar com a associação das medidas farmacológicas aos procedimentos de medicina física e reabilitação e ao acompanhamento psicológico diminui o sofrimento e as incapacidades e melhora a qualidade de vida.

Descritores: Dor abdominal, Dor miofascial, Dor visceral, Tratamento interdisciplinar.

INTRODUCTION

Visceral pain may be induced by tension or stretching of hollow viscera or of the capsule of parenchymal viscera and by peritoneal traction or stretching. Abdomen is one of the most frequent sites for acute or chronic painful syndromes caused by visceral diseases, caused by referred pain coming from adjacent structures and/or as a consequence of systemic injuries. Annual chronic abdominal pain incidence is 15 cases out of 1 thousand individuals.

Visceral diseases may determine different types of pain: true visceral, referred visceral, localized parietal or referred parietal. True visceral pain – not referred – is manifested in the abdominal midline, without precise location in the epigastrium, periumbilical region or mesograstrium, in general described as colic and associated to nausea, vomiting, sweating or paleness[1]. Referred visceral pain is located in myotomes and dermatomes supplied by neurons which project from the same medullar segments of the affected viscera[2].

Localized or non-referred parietal pain results from the irritation of the parietal peritoneum and is located in the abdominal wall corresponding to the injury site. Referred parietal pain is manifested distant from the nociceptive stimulation site[1,2].

Among the most frequent causes of abdominal pain there are infectious or chemical inflammatory processes, ischemic diseases, dysfunctional diseases and tumors[3].

In general, visceral pain is not evoked by solid viscera and organs, such as liver, kidneys, and lung parenchyma, among others, and is not necessarily associated to visceral injury; it is in general diffuse and poorly located, may be referred distant from the affected viscera and is followed by autonomic and motor

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reflexes which act as pain transmission maintaining and facilitating system[4,5].

Peripheral neuropathic abdominal pain is located in the distribution region of one or more caudal thoracic roots (D_8 to D_{12}), is characterized as burning, flashing, jumping or tingling, is associated to hyperalgesia, hyperesthesia, hyperpathia and/or other sensory and motor abnormalities, including wall laxity and/or neurovegetative changes[1].

This study aimed at analyzing anatomic, clinical and therapeutic aspects of visceral abdominal pain.

ANATOMIC ASPECTS

The abdominal cavity is clinically divided in regions: right and left hypochondrium, epigastric, umbilical, hypogastric, right and left lumbar regions, right and left inguinal[6]. It may also be divided in quadrants: upper right (URQ) and left (ULQ) quadrant, and lower right (LRQ) and left (LLQ) quadrant. The URQ lodges right liver lobe, gallbladder, pylorus, part of the duodenum, head of pancreas, right adrenal gland, right kidney, right colic flexure (hepatic), upper component of the ascending colon and right half of the transverse colon.

ULQ lodges left liver lobe, spleen, stomach, jejunum, proximal ileum, body and tail of pancreas, left kidney, left adrenal gland, left colic flexure, left half of transverse colon and upper segment of descending colon.

LRQ lodges caecum, appendix, most part of the ileum, lower segment of ascending colon, ovary, right oviduct, abdominal segment of ureter, right spermatic cord, uterus (when increased) and bladder (when very full).

LLQ lodges sigmoid colon, distal segment of descending colon, ovary, left oviduct, abdominal segment of ureter, left spermatic cord, uterus (when increased) and bladder (when very full)[6].

CLINICAL CHARACATERISTICS OF VISCERAL PAIN

Epigastric pain is caused by stomach, gallbladder, duodenum, pancreas, liver, esophageal distal region, heart and lungs injuries, especially by peptic ulcer, perforated ulcer, gastritis, pyloric spasm, gastric carcinoma, chronic or acute pancreatitis, cholecystitis, biliary lithiasis, lower esophageal perforation, chemical or bacterial esophagitis, myocardial infarction, pericarditis, congestive heart failure or epigastric hernia[1,5]. Stomach visceral pain is in general located in the mid-epigastric region. The involvement of peritoneum parietal layer by gastric diseases may determine pain only in the upper left abdominal quadrant. Diseases involving duodenal bulb cause visceral pain in the epigastric region and possibly in abdominal URQ. Distal duodenum diseases induce pain in the periumbilical region[1].

Right hypochondrium pain is induced by liver, gallbladder and colon hepatic flexure diseases, right hemithorax and right hemidiafragm disorders, musculoskeletal or nervous system diseases. Most frequent injuries are chronic or acute cholecystitis, biliary colic, liver and biliary system cancer, liver and pancreas abscesses, chronic or acute hepatitis, right hemidiafragmatic pleurisy, subphrenic abscess, duodenal ulcer, intercostal neuralgia, pos-cholecystectomy syndrome and pneumonia[1,5,7,8]. Liver pain is located in the right hypochondrium, epigastrium or distal chest region, worsens with expirations and may be referred to right shoulder and scapula[1,8,9].

Left hypochondrium pain is induced by spleen and colon splenic flexure diseases, left hemothorax and tail of pancreas injury, neurological and musculoskeletal diseases. Thromboembolism or thrombosis of splenic nerves, splenic infarction, splenic abscess, splenomegaly, colitis, spleen rupture, colon splenic flexure carcinoma, pneumonia, intercostal neuralgia, diaphragmatic hernia, pericarditis and angina pectoris are the most frequent injuries[1,5]. Pancreatic visceral pain is characterized by constant abdominal discomfort, with irradiation to lumbar or distal dorsal regions.

Lumbar pain is induced by kidneys, ureters, head and tail of pancreas or colon injuries. Major causes are peri-renal abscesses, pyelitis, pyelonephritis, renal abscesses, renal tumor, renal tuberculosis, post-nephrectomy pain syndrome, intercostal neuralgia of one or more nerves (T_8-T_{11}), radicular compression by tumor, vertebral diseases and herpes zoster[1,5].

Periumbilical pain is induced by small intestine, appendix, caecum and body of pancreas injury, musculoskeletal or neurological diseases, especially by acute intestinal obstruction, Meckel's diverticulitis, superior mesenteric artery thromboembolism, enterocolitis, umbilical hernia, intercostal neuralgia (T_9-T_{11}) or myofascial pain syndrome[1,5].

Right iliac region pain is induced by appendix, small intestine, caecum, right kidney and ureter, right oviduct or ovary injuries, musculoskeletal or neurological diseases, such as acute appendicitis, chronic salpingitis, ovarian follicle rupture, renal colic, acute pyelitis, caecum carcinoma, inguinal hernia, acute epididymitis and psoitis[1,5].

Right iliac region pain is caused by sigmoid colon, left urinary tract or internal female genitalia injuries, musculoskeletal or neurological diseases. Common causes are acute salpingitis, ectopic pregnancy, ulcerative colitis, psoitis, diverticulitis, sigmoid volvo, intestinal intussusception, intestinal obstruction, inguinal hernia, epididimitis, segmental neuropathy (herpes zoster, disc hernia, medulary tumor), iliohypogastric or ilioinguinal nerves neuralgias and lumbar myofascial pain syndrome[1,5,9].

Hypogastric pain is due to bladder and internal genitalia injuries, intestinal diseases, musculoskeletal or neurological disorders. Acute cystitis, bladder distention (bexigoma), prostatitis, prostatic hypertrophy, bladder carcinoma, retosigmoid tumor, chronic constipation and internal female genitalia diseases are the most frequent causes[1,5].

Colic periumbilical pain, coming from the small intestine, may be triggered by visceral lumen distension or by excessive motor activity. Infiltrative and inflammatory processes affecting parietal peritoneum may induce somatic pain and periumbilical visceral pain[9,10]. Ascending colon and right half of transverse colon distension may result in periumbilical and/or suprapubic pain. Left half of transverse colon and descending colon distension determines pain in mid infraumbilical and suprapubic portion[10].

Sigmoid colon injuries induce abdominal LRQ or LLQ pain and in the suprapubic region when there is peritoneal involvement due to mesenteric stimulation[1,2].

Peritoneal abdominal pain in the acute stage may be associated to nausea, vomiting, fever, tachycardia, hypertonia and abdominal stiffness, sudden painful abdominal wall decompression and abolishing of bowel sounds. Parietal peritoneum involvement in general causes pain in the region corresponding to the affected envelope. Musculoskeletal pain may be referred to the same visceral pain reference regions[10,11].

Vertebral, ligamentous and/or muscular dysfunctions or changes of the thoracolumbar transition may generate pain or discomfort in inguinal, pubic, gluteous and/or abdominal regions and/or lower limbs. Pain may simulate abdominal and/or pelvic visceral diseases and/or hip ligamentous or joint diseases[11].

Visceral nociceptive pain is diffuse and deep, poorly located and described as heavy, colic, jumping or pricking, has variable intensity and may be constant or intermittent, disablilng or not. In association, there may be dispareunia and dysmenorrhea, as well as sleep disorders, difficulty to perform mild physical exercises and practical and daily life activities[11].

ABDOMINAL PAIN OF MYOFASCIAL ORIGIN

Myofascial pain syndrome (MPS), especially of abdominal rectus and oblique muscles, results in abdominal wall muscles pain and may mimic visceral diseases. Referred pain of abdominal muscles myofascial trigger points (TP) in general is located in the same quadrant and possibly in a different abdominal quadrant or in lumbar or dorsal region. Abdominal muscles TPs activation may be caused by trauma or muscle stresses or may represent visceral-somatic responses of visceral diseases such as peptic ulcer, intestinal parasitosis, ulcerative colitis, colon diverticular disease or cholecystopathy. TPs may trigger somatovisceral responses, including vomiting, anorexia, nausea, intestinal colic, diarrhea, vesical or sphincter spasm or dysmenorrhea. These symptoms associated to abdominal wall pain and stiffness may mimic acute visceral disease, such as appendicitis or cholecistitis.

TPs activation may be perpetuated by emotional stress, adoption of inadequate postures and inadequate physical activities.

MPS pain is worsened by movement, cough and is in general associated to muscle reflex spasm and segmental and suprasegmental discrasic abnormalities[1,2,6].

DIAGNOSIS

Diagnosis is based on history and physical evaluation. Laboratory, imaging, endoscope and electrophysiological tests help abdominal pain differential diagnosis.

During history one should consider gender, current patient's age, age at beginning of symptoms and its duration. Pain should be characterized as to location, installation, irradiation, intensity, rhythm, periodicity, duration, interference with activities including sleep, ingestion of alcohol, spices, fatty food, fasting, defecation and use of drugs. One should evaluate temporal relations, worsening and improving factors and circumstances generating its installation and maintenance[5,11,12]. One should also evaluate pain relation with menstrual cycle, traumas or abdominal scars; evaluate triggering factors related to worsening of pain and/or improving pain factors such as cough, sneezing, elimination of flatus or feces, micturition, physical movements and efforts. Check the use of drugs, such as angiotensin inhibitors, beta-blockers, antibiotics, chemotherapeutic drugs, proton pump inhibitors and anti-inflammatory drugs.

During history, ask about weight loss, fever, anemia, adynamia, syncope, adenomegalies, abdominal masses, nausea, vomiting, diarrhea, obstipation, abdominal distension, belching, pirosis, early satiety, postprandial fullness, anorexia, jaundice, choluria, acholia, pruritus, hematemesis, melena, enterorrhagia, arthritis, arthralgia, chest pain, urinary urgency, nighttime urination, dispareunia, dysmenorrhea, low back pain, dorsal pain, fatigue, headaches, palpitations, insomnia, anorexia or increased appetite, presence of sexually transmitted diseases, habits, etc.[1,9].

As to family history, evaluate factors related to abdominal pain, such as acute intermittent porphyry, Mediterranean fever, digestive tract cancer, diabetes mellitus, etc.

Clinical history should include background about abdominal surgeries, injuries, muscle fibers micro-trauma after physical exercises, repetitive or prolonged activities. Elements such as cough, body torsion, changes in position, physical activities, carrying heavy objects, which increase tension on muscle groups, may decondition patients and trigger or worsen abdominal pain. Visceral involvement symptoms, such as nausea, vomiting, diarrhea, obstipation, fever and chills, are rare in such cases, except for the worsening period of painful crises[1,5,9].

At physical evaluation, abdominal palpation determines the presence of distension, tumor, ascitis, wall asymmetry, dermatological spots or injuries. One should look for abdominal stiffness, hepatomegaly or splenomegay, signs of peritonitis, motor deficits. Evaluate the presence and/or abnormalities of bowel sounds. Physical evaluation should be complete, including rectal and vaginal touch, and search for MPS-related TPs.

A study[13] has used Carnett test to evaluate the presence or absence of visceral diseases. Abdominal palpation of patients with muscle contraction also results in pain and discomfort.

Very often clinical findings are incompatible with complaints and additional exams may help the diagnosis. Such exams include blood count, erythrocyte sedimentation rate (ESR), glucose, creatinine, bilirubin, a-amilase, lipase, alkaline phosphatase, urinary porphyrins (porphobilinogen), free T4 and TSH, serum calcium and phosphorus, hemoglobin electrophoresis, feces parasitological exam, urine exam, Widal reaction (recent diarrhea), tolerance to lactose test (diarrhea), etc.[5,13,14].

Chest X-rays, total abdominal ultrasound (US), pelvic and/or transvaginal ultrasound, CT, abdominal MRI, urinary tract scintigraphy, proximal digestive endoscopy and colonoscopy, among other additional exams, should be tailored for each case. This way, for rostral abdominal pain one should request chest X-rays and for dorsalgia, thoracic and lumbar column X-rays[13,14].

Total abdominal US for hypochondrium or epigastrium pain discards biliopancreatic diseases and for mesogastric and dif-

fuse pain without digestive symptoms it discards aneurysm or tumors. Pelvic or transvaginal US for pelvic pain helps the diagnosis of gynecological or urological diseases; kidney and urinary tract US is indicated for flanks or lumbar region pain.
Proximal digestive endoscopy is indicated for epigastric pain or discomfort and colonoscopy is indicated for intestinal transit changes in patients above 45 years of age, with family history of colorectal cancer or polyposis, changes in pain or intestinal transit pattern, short-duration recurrence symptoms and/or alarm signs (weight loss, anorexia, rectal bleeding, anemia, nighttime symptoms). Colonoscopy or opaque enema and/or anorectal manometry may be useful for intestinal obstipation without organic injury[13,14].
Laparoscopy is indicated for severe and disabling abdominal pain with undefined diagnosis or when abnormalities were not explained by physical, laboratory or imaging evaluation. Laparoscopy in chronic abdominal pain patients shows abnormalities in 53% of cases[13,14]. It is worth stressing that peritoneal adhesions are in general not related to chronic abdominal pain.
In females below 45 years of age with symptoms such as non-restorative sleep, low back pain, clinical presentation suggestive of fibromyalgia, polaciuria, nicturia, dispaurenia, dysmenorrhea, etc., in the absence of alarm signs or symptoms or family history of colorectal cancer and with normal physical evaluation, investigation should be judicious and progressive[8].
When the investigation does not reveal structural and/or functional changes related to visceral abnormalities, gastroenterological functional syndromes such as dyspepsia, nonspecific dysmotility or irritable bowel syndrome, functional abdominal pain syndrome, or nonspecific functional abdominal pain, gallbladder or Oddi's sphincter dysfunction, biliary or pancreatic, urologic or gynecological dysfunctions, neurological dysfunctions (migraine or abdominal epilepsy), abdominal muscles MPS[9], psychosocial aspects of pain should be evaluated. Local anesthetic infiltration allows for abdominal wall MPS diagnosis when clinical and additional exams are normal[7,11,12].
Chronic abdominal pain diagnosis should contemplate functional gastrointestinal diseases responsible for most gastroenterological consultations. In patients with negative investigation for structural or biochemical changes, identify subgroups of functional gastrointestinal abnormalities, such as irritable bowel disease and functional abdominal pain, among others.

TREATMENT

Treatment aims at eliminating causes, correcting primary abnormalities and their repercussions, including physical and environmental stressors and at preventing pain recurrence.
For benign visceral, musculoskeletal and neuropathic diseases, one should explain to patients the favorable aspect of the diagnosis, the possibility of remissions and exacerbations, body-mind relationship and the role of stress in worsening or triggering causes. Patients should be oriented to change lifestyle to maintain pain improvement[15].
Dietary guidance, such the use of fractioned diet, avoiding fatty foods, coffee and alcohol, is an important stage of abdominal pain treatment.
Symptomatic drugs should be indicated and directed to the remission of predominant symptoms or primary abnormalities. Prokinetic agents, acid secretion inhibitors, 5-hidroxi-triptamine agonists[13,17], antispasmodics, antidepressants, anxiolytics, analgesics (opioids or not), Helicobacter pylory eradication, acupuncture[11], balanced diet, adequate ingestion of fibers and psychotherapy may be indicated for gastrointestinal diseases[8-10,16].
Due to the difficulty to locate the specific cause responsible for chronic abdominal pain, treatment is challenging. In these cases there is peripheral and central sensitization as well as pain endogenous modulation change. Analgesics, anticonvulsants and antidepressants are used to decrease sensitization and improve endogenous pain modulation system. Non-pharmacological treatments and additional treatment options may be indicated[14,17].

CONCLUSION

Patients with chronic visceral pain are usually undertreated because they are underdiagnosed. Contributors to pain relief are symptoms control, normalization or restoration of patients' physical, emotional and social components, elimination of fear of other diseases, correction of social, professional and family mismatches. The interdisciplinary treatment with association of pharmacological measures to physical and rehabilitation medicine and to psychological follow up decreases distress and incapacities and improves quality of life.

REFERENCES

1. Al-Chaer ED, Traube RJ. Biological basis of visceral pain: recent developments. Pain. 2002;96(3):221-25.
2. Olden KW. Rational management of chronic abdominal pain. Comp Ther. 1998;24(4):180-6.
3. Buéno L, Fioramont J, Garcia-Villar R. Pathobiology of visceral pain: molecular mechanisms and therapeutic implications-III. Visceral afferent pathways: a source of news therapeutic targets for abdominal pain. Am J Physiol Gastrointest Liver Physiol. 2000;278(5):670-6.
4. Gebhart GF. Pathobiology of visceral pain: molecular mechanisms and therapeutic implications IV. Visceral afferent contributions to the pathobiology of visceral pain. Am J Physiol Gastrointest Liver Physiol. 2000;278(6):834-8.
5. Cervero F, Laird JM. Visceral pain. Lancet. 1999;353(9170):2145-8.
6. Nozu T, Okumura T. Visceral sensation and irritable bowel syndrome; with special reference to comparison with functional abdominal pain syndrome. J Gastroenterol Hepatol. 2011;26(Suppl 3):122-7.
7. Corazziari E, Shafter EA, Hogan WJ, Sherman S, Toouli J. Functional disorders of the biliary tract and pancreas. Gut. 1999;45(Suppl 2):II48-54.
8. Talley NJ, Stanghellini V, Heading RC, Koch KL, Malagelada JR, Tytgat GN. Functional gastroduodenal disorders. Gut 1999;45(Suppl 2):II37-42.
9. Giamberardino MA. Visceral pain. Clinical Updates. Pain. 2005;XIII(6):1-6.
10. Pezet S, McMahon SB. Neurotrophins: mediators and modulation of pain. Annu Rev Neurosci. 2006;29:507-38.
11. Thompson WG, Longstreth GF, Drossman DA, Heaton KW, Irvine EJ, Müller-Lissner SA. Functional bowel disorders and functional abdominal pain. Gut. 1999;45(Suppl 2):II44-7.
12. Lin TY, Teixeira MJ, Ungaretti A Jr, et al. Dor pelviperineal. Rev Med. 2001;80(ed. esp. pt.2):351-74.
13. Dapoigny M. Troubles fonctionnels intestinaux. Rev Practic. 1999;49:1559-64.
14. Janssen HA, Borghouts JA, Muris JW, Metsemakers JF, Koes BW, Knottnerus JA. Health status and management of chronic non-specific abdominal complaints in general practice. Br J Gen Pract. 2000;50(454):375-9.
15. Kraychete DC, Guimarães AC. Hiperalgesia visceral e dor abdominal crônica: abordagem diagnóstica e terapêutica. Rev Bras Anestesiol. 2003;53(6)833-53.
16. Thompson WG, Longstreth GF, Drossman DA, et al. Functional bowel disorders and functional abdominal pain. Gut. 1999;45(Suppl 2):II43-7.
17. Guariso G, Mozizymas R, Benini F. Experience of recurrent abdominal pain: evaluation based on the Eland scale. J Pain Symptom Manage. 1997;14(3):133-4.