Review of Literature

Understanding diverticular disease through western medicine & the ayurvedic lens

Introduction: symptoms & classifications of diverticular disease.

Diverticular disease is a chronic gastrointestinal tract condition in which pockets, also know as 'diverticula,' form at weak points in the mucosa and sub-mucosa layers of the colonic wall. While Western medicine doesn't fully understand why this happens, it is an increasing problem in Western and industrialized countries. Those over 40-years of age most often experience Diverticular disease and the percentage increases with age.[i] These diverticula or pockets trap fecal matter in the bowl and can eventually cause abdominal pain, cramping, bloating, diarrhea, and constipation. There are several classifications of direrticular disease. The two main classifications are diverticulosis and diverticulitis. **Diverticulosis** is a non-inflammatory condition in which pockets are present. This condition can be clinically asymptomatic for years until impaction or other complications occur. One of these complications is **dirverticulitis** an inflammatory condition in which symptoms are more noticeable; pain can range from mild to severe. Infection, internal bleeding, intestinal obstruction, abscesses, and perforation or fistula (an openings between the bowel and other organ such as the urinary tract) are also complications, which can occur. Diverticular disease can be very serious and has an increasing impact on the lives of those who experience it including pain, loss of work and wages, lower productivity, and high medical costs.[ii] [iii] Each year there are $2.4 billion in costs from 300,000 hospital admissions and 1.5 million inpatient care days.[iv]

Summary of Western Pathology:

It is agreed in Western medicine that the pathogenesis of diverticular disease has a combination of factors, it is not fully understood which factors contribute most to diverticular disease and how to prevent this from occurring. Even the treatment of this condition is under some debate.

In 2010 The Journal of medicine published a review of the current evidence and theories related to the functional changes in the body that occur in response to diverticular formation. In this review it was suggested that age, a low-fiber diet, possible genetic factors, the impact of medicine usage, and the coexistence bowl disease eventually leads to changes in the colon wall which are affected by colonic pressures and mobility causing the diverticula to form; however evidence could not support this hypothesis.[v] To further complicate the understanding of this condition is has been observed that both left and right colon diverticular disease are experienced. In western nations there is a higher occurrence of left colon diverticula, while Asian nations have a

higher occurrence of right color diverticula. This evidence has lead researchers to believe that genetics is more of a factor in Asian patients while a diet of red meat and low fiber are factors in the west.[vi] Another theory in this same review suggests that a thickening of the muscular layer due to deposits of collagen and elastin in the colonic wall have been consistently observed in diverticulosis; it is believed that this imbalance of structure affects both mobility, increased intraluminal pressure and the effectiveness of peristalsis, but evidence is still lacking in this hypothesis.[vii] Irritable bowel syndrome has also been linked as an earlier stage of diverticulosis, however this is hard to correlate and is lacking in evidence. [viii]

A twelve-year study ending in 2009 looking at multiple lifestyle factors including Body mass index (BMI) physical activity, diet, smoking, and more showed a positive correlation between being overweight, obesity and physically inactive and the increase of diverticular disease requiring hospitalization. It was found that out of the 36,592 women ages 49-83 years old followed, 626 cases of diverticular disease requiring hospitalization and two deaths were recorded. In this study it was found that women with a BMI≥25-29 had a 29% increased relative risk (RRs) of diverticular disease compared to a 33% for obese women (BMI≥30). Exercise of less than 30-minutes per day increased the RRs to 42% over those who exercised 30-minutes or more per day. Women who exhibited either obesity or being overweight and less that 30-minutes of exercise per day were at a 95% increased risk for developing diverticular disease.[ix]

In 2016, Antonio Tursi, reviewed the most current research of diverticulosis. In this review the complex interactions of age, diet, genetic factors, colonic motility and changes in colonic structure are mentioned as the 'likely' but misunderstood contributors to this condition. It is difficult to know the number of people who have this condition due to the lack of symptoms recognized in early stages, however age is commonly agreed upon factor in this condition. It is estimated that 5% of persons 40-years of age have diverticulosis, growing to 65% at 80-years of age. It is estimated that only 10-25% of patients with diverticulosis will manifest recognizable symptoms.[x] [xi]

Western Disease Management:

It has been presumed for years that diverticulitis is the result of a bacterial infection due to the obstruction of fecal mater in the colon, thus antibiotics have been used even in uncomplicated cases. Acute Diverticulosis historically has been treated with hospitalization, intravenous antibiotic, digestive rest and routine colonoscopy, however the trends are changing. This shift includes probiotics, mesalamine and gut directed antibiotics. [xii] [xiii] Intravenous fluid therapy has also been found to have similar overall results to that of antibiotics use "proving that antibiotic therapy is not

superior to fluid only therapy."[xiv] Beyond the physical treatment, lower health-related quality of life and long-term emotional distress concerns need to be addressed.[xv] Although the need for this is mentioned, no specific support was mentioned.

Antibiotic Therapy:

Rifaximin: a non-absorbed antibiotic agent to fight gram-positive and gram-negative bacteria. It is used in traveler's diarrhea and hepatic encephalopathy. It was found to control or conceal the symptoms of diverticulitis, but does not prevent it.[xvi]

Mesalazine: Aminosalicylic acids, which inhibits free radicals. Mesalazine was able to reduce pain significantly, but no other significant results[xvii]

Probiotics: *E.coli* was found to lengthen the time between episodes by 2.4 months in uncomplicated diverticulitis patients, however there were mixed results combining probiotics with Rifaximin and Mesalazine mentioned about. Studies were small and no significant results were seen.[xviii]

Dietary Fiber: Inconclusive and inconsistent findings. Some studies found dietary fiber it to be very helpful other's found that high fiber diet did not reduce prevalence of diverticulosis. *A 41% lower risk of diverticular disease for those who consumed ≥25.5 g/day for women and ≥26.1 g/day for men compared to those whose intake of fiber was less than 14g/day.[xix]

Recommended Western Conservative Therapy:

Stage 0 (Asymptomatic diverticulosis): High-fiber, vegetarian diet, physical activity, and appropriate body weight for fame. **Stage 1** (Uncomplicated diverticulitis): Administration of fluids with out specific therapy in individuals with no other risk factors such as immune suppression, hypertension, chronic kidney disease or allergic predisposition.

Stage 1b (Diverticulitis with a solid mass of inflamed tissue or peri-diverticulitis)

Stage 2a (Concealed perforation, small abscess ≤ 1-cm): Antibiotic treatment especially with elevated inflammatory markers. Severely ill patients are to be treated with possible drainage and intravenous antibiotic. Surgery is necessary when complications are present.

Stage 2b (macro-abscess)

Stage 2c (Peritonitis) Surgery is paramount!

Stage 3: A distinction in Stage 3 is important to note.

Stage 3a (SUDD: Symptomatic Uncomplicated Diverticular Disease)

Stage 3b (Relapsing SUDD)

Stage 3c *Insufficient data to support long-term prevention and treatment of chronic diverticulitis. IBS as a result of diverticulitis should be excluded.[xx]

Ayurveda Overview:

Ayurveda is an ancient science of life knowledge or life science. Its goal is to maintain health and longevity, but not only physical health. Ayurveda sees health as a lifestyle that promotes physical health, peace of mind, and spiritual awareness. This holistic approach to medicine uses diet, lifestyle, meditation, yoga/movement, herbs, colors, gems, body therapies and more as the medicines toward health and wellness. Ayurveda views everything as both a medicine and a poison depending on how it is used. It is stated in the Charaka Samhita, that even poison can be used as an excellent drug if it is properly administered and vice versa. "A drug (dravya) is defined as a substance which will possess properties (guna) and actions (karma) together with an inherent relationship … and all drugs (dravyas) in the universe, are composed of the five elements (see explanation below)". [xxi]Health is based on the relationship between the patient and their environment. [xxii] In Ayurveda the patient, not the disease is treated.[xxiii] Therefore in order to treat a patient there are three things you need to know first: the nature of the patient, the nature of the imbalance, and the nature of the medicine.[xxiv] *('Nature' mentioned here relates to the three doshas of vata, pitta, and kapha and will be explained below.) Symptoms are viewed as the body's way informing us that something is out of balance. Treatment is given to address symptoms and/or diseases; to bring the body back into balance therefore promoting health and normal functioning, but most importantly to maintain that health long term.

It is important to note here that the doshas mentioned above as vata, pitta, and kapha, are formed from **the 5-elements** present in all things that exist and which direct doshic expression. These elements are important in understanding the processes of disease and healing in general and will be addressed more specifically in the treatment of diverticular disease. Vata is made from the elements of air and ether and is therefore responsible for movement (air) and space (ether), which connects all things. Pitta is made up of the elements fire and water, and therefore is what brings heat, warmth (fire), and flow (water) along the path of least resistance; pitta is responsible for digestion in all its forms: the digestion of food, thoughts, impressions, sensation. Kapha dosha is made up of the elements earth and water; earth brings heaviness and substance, while water again allows for flow and all liquid matter.[xxv] It is the unique balance of these elements and their corresponding dosha within each of us that determines our physical structure, characteristics, and tendencies in this life (i.e. the nature of the patient).[xxvi] Just as we each have our own distinctive fingerprints, each person has their own unique combination of dosha or elements. Everything has a combination of all of the elements and dosha; all are necessary for existence, but in varying

amounts. These differences help us to understand why some are prone to certain conditions while others are not. For persons of predominant vata dosha are typically thin & lean, very tall or very short; they are typically creative, spontaneous, and energetic, prone to dryness, being cold, and constipation; they can get easily overwhelmed and distracted. Persons of predominantly pitta dosha are typically athletic, focused, intense, organized, they are passionate and driven and are prone to skin irritations, infections, and acne. People of predominantly Kapha dosha stocky and strong, loving and compassionate; solid and stable, they typically live long, but are prone to depression and lethargy and illnesses of the lungs and heart. When the dosha are balanced the positive qualities shine through, when they are out of balance illness, disease, and negative qualities are seen. This is important to note, because each disease condition has it's predominant dosha or its root cause due to a doshic excess and/or deficiency.[xxvii]

In ayurveda, disease is related to one primordial cause and three basic causes listed below: these relate directly to this balance of the dosha:

Forgetting our true nature as spirit: when detached from spirit, we are dominated by the ego, seeing ourselves as separate, and living to peruse sense overindulgence.

1. **The unwholesome conjunction of the senses with the object of their affection:** succumbing to our ego to fulfill the desires of our senses instead of what it most healthy for our body; (i.e. eating ice cream because it tastes good.)
2. **Intellectual blasphemy**/crimes against wisdom: You know better, but you do it anyway and don't listen to reason
3. **Transformation /decay due to time and motion:** a natural process of time which can not be altered and the acceleration of time by doing too much and wearing out, burning out, or drying out early[xxviii]

"*Disease occurs when factors or forces come into play that interfere with the natural rhythms of the body preventing the phase of alleviation from occurring." Dr Mark Halpern*[xxix]

Ayurveda sees **accumulation** of the elements/dosha, **aggravation** (excess elements/dosha), and **alleviation** (digestion or elimination of the excess elements/dosha) as a natural progression, which occurs through the course of our day and lifetime. It begins with what we take into our bodies both subtle to gross. On the gross or physical level this means what we eat and drink; however, when the process of alleviation (in the digestive system) is blocked, stopped, or overwhelmed, overflow occurs. **Overflow** causes symptoms to arise, because of excess element(s). The digestive system is unable to process these elements either because of low digestive power (bogged down) often a product of overwhelm. The elements are released into the body venturing

out of the digestive system to other tissues and organs in the body.[xxx] From overflow **relocation, manifestation, and diversification, (RMD)** occur causing imbalance and disease to show up as symptoms. Imbalance starts out mild, maybe even unrecognizable and then progresses until we notice them; sometimes symptoms aren't recognized until full blown disease is present. Therefore disease happens most often when, as explained above, we forget our true nature as spirit and consume foods based on our desire for pleasure (Eating too many sweets, because they taste good!!). Thus food becomes our poison and/or our medicine.

Summary of Ayurvedic Classification of Diverticular Disease:

On a physical level digestion is the key to health and all disease ultimately is a result of poor digestion (mandagni).[xxxi] **Udara Roga** means abdominal pain, and is the general classification of diverticular conditions since the cause and the symptoms reside here. Vata dosha is vitiated causing the all forms of Udara Rogas experienced in humans as a result of aggravation of waste products (digestive and metabolic) due to defective digestive agni.[xxxii] Diverticular disease in ayurveda is seen as a digestive disorder or syndrome rather than a disease as the symptoms are the diagnosis. It is listed in the classical ayurvedic texts under the heading of **Udara Nidana** or enlargement of the abdomen. In all types of Udara Nidana there is an accumulation of waste (especially feces), poor digestion, burning sensation, swelling, flatulence and can result in excess fluids in the abdomen.[xxxiii] More specifically Vataja or **Vatodara**: abdominal enlargement due to a vitiation of vata dosha (accumulation, aggravation and overflow) there is an excess of air throughout the abdomen, flatulence and boating cause a hollow sound when the abdomen, like an inflated leather container, when tapped along with pain and noises.[xxxiv] In diverticulitis, pitta dosha is also vitiated. Pittodara is added to the vatodara classification, as fever, fainting, burning sensation, thirst, and inflammation, is part of the heat associated with pitta dosha. Ksata (perforation of the intestines) may also occur.[xxxv]

Summary of Ayurvedic Nidana (Etiology/Basic Causes):

Vata dosha is aggravated with fasting, irregular eating times, consumption of a low quantity of food, as well as the intake of 'un-unctuous' foods.[xxxvi] Un-unctuous foods relate to foods low in oil, moisture, and substance such as dry, hard, light, and cold foods. Eating an abundance of foods with the bitter, pungent, or astringent taste also promote and aggravate the qualities of vata and cause complications. Over exertion and excess movement including exercise, an overly busy schedule, stress, and the lack of a regular routine vitiate vata as well. When aggravated vata (air and ether), results in systemic dryness, depletion, gas, and constipation. Kapha (earth & water) plays a secondary role as it comes to the rescue to stabilize vata. In this instance, kapha, traps vata between

the skin and muscle of the abdomen causing swelling and bloating.[xxxvii] Suppression of natural urges should not be suppressed by force or habit including: Flatus, feces, urine, sneeze, thirst, hunger, sleep, cough, breathing on exertion, yawn, vomiting, and ejaculation of semen as they add to disease.[xxxviii] Suppression to eliminate waste, flatus and udavarta (belching) are indicated to aggravate vata (air) causing it to move sideways in the abdomen affecting the cardiac region, urinary bladder and anus and suppresses the power of digestion. As natural urges are suppressed an upward movement (Udana vayu) occurs in the alimentary tract instead of the natural downward flow (Apana vayu) aiding elimination. This causes pain in the abdomen, exhaustion ever without exertion, obstruction to further eliminate flatus, urine, and feces, as well as a loss of vision, a loss of digestive capacity, and diseases of the heart. Furthermore, suppressing the urge to eliminate feces can cause pain in the calves, a runny nose, headache, belching, cutting pain in the rectum, and restriction of the heart, and more.[xxxix]Among the other suppressed urges in the classical texts it is interesting to note that suppression of flatus can also cause abdominal tumor and loss of vision; suppression of belching produces loss of taste or appetite, tremors, cough and hiccups; suppression of thirst will give rise to emaciation, weakness, deafness, delusion, giddiness and heart disease, and suppression of sleep causes delusion and feelings of heaviness.[xl]

Pitta dosha (added to vata vitiation in the case of diverticulitis) accumulates and is aggravated by pungent, sour, and salty foods. Anything that is sharp, spicy, and hot also aggravates pitta including the heat of a fire, overexposure to the sun and eating before the previous meal is digested completely. Pitta moves upward suppressing digestion and obstructing the channels of kapha. Kapha or in this instance rasa are the fluids or mucosal lining protecting the digestive system. When rasa is obstructed, burning sensation and indigestion occur, heat is allowed to run ramped and inflammation results. [xli]

Rupa (Signs & Symptoms):

Signs and Symptoms of Vatodara:

1. Pain from mild to extreme
2. Swelling of abdomen, hands, legs and scrotum
3. Cracks appearing in the abdomen
4. Increase and decrease of swelling in the abdomen without appropriate cause
5. Colicky pain in the sides of the abdomen and chest
6. Belching (Udavarta- upward moving wind)
7. Feelings of weakness, all over discomfort, illness, and cracking pain in the phalanges, dry cough, emaciation, anorexia and indigestion

8. Heaviness in the lower abdomen
9. Non-elimination of flatus, feces, or urine.
10. Grayness or redness of the mails, eyes, face, skin, urine and stool
11. Thin, black net-work of abdomen veins
12. Hollow sound upon percussion of abdomen
13. Upward, sideways, and downward movement of vata accompanied by pain and sounds.[xlii]

Signs and Symptoms of Pittodara:

1. Fever, thirst, fainting, diarrhea, burning sensations and giddiness
2. Pungent taste in the mouth
3. Nails, eyes, face, skin, urine, and stool which appear green or yellow
4. Blue, yellow, green, or coppery net-work of abdomen veins
5. Sensations of burning, pain, heat, smoke, perspiration, stickiness, and softness to touch.
6. Ascites: filling of the abdomen with water (very serious)[xliii]

Samprapti (Pathogenesis**):**

Vata dosha accumulates and becomes aggravated in the colon (purishavaha srotamsi). Because downward movement (apana vayu) is blocked, vata moves sideways (vyana vayu) into the cardiac region, urinary bladder and anus and suppresses the power of digestion. Overflow moves into the mucosa/lymph (rasa/kapha) and blood (rakta). Vata moves into the colon (purishavaha srotamsi) as the site of relocation where it manifests and diversifies. Lacking the downward flow of apana vayu manifests as constipation. Air (vata) unable to more downward continues to push sideways (vyana vayu) on the colon increasing pressure on the muscular wall (mamsa dhatu) of the colon (purishavaha srotamsi) causing pouches to form. Vata pushes pitta resulting in inflammation and infection with possible bleeding.

Stage	Evidence	Dosha	Sub-dosha	Dhatu	Srota	Herb Category	Herb Example
AA	PPM: Gas & constipation	Vata	Apana	Rasa	Purisha VS	NA	Diet & Lifestyle
O	MT: systemic dryness	Vata	Vyana	Rasa	Rasa VS	Demulcent	Licorice, Slippery Elm Marshmallow Shatavari
O	MT: systemic cold and fatigue	Vata	Vyana	Rakta	Rakta VS	Blood Tonic	Amalaki, Arjuna, Turmeric,

						Circulatory Stimulants	Cinnamon, Fresh ginger, Cardamom
RMD	Dirverticulosis/Diverticulitis: w/Constipation	Vata	Apana	Rasa	Purisha VS	Laxatives	Triphala, Cascara Sangrada, Aloe gel Flaxseed
RMD	Dirverticulosis/Diverticulitis: Pocket formation	Vata	Vyana	Mamsa	Purisha VS	Bowel Tonic Muscular Tonic	Haritaki Slippery Elm
AA	PPM: Burning indigestion	Pitta	Pachaka	Rasa	Anna VS	NA	Diet & Lifestyle
O	MT: Burning mucous membranes	Pitta	NA	Rasa	Rasa VS	Demulcents	Licorice, Shatavari, Aloe Vera
O	MT: Systemic heat and intensity	Pitta	Ranjaka	Rakta	Rakta VS	Alterative	Dandelion Rt, Burdock Rt Aloe Vera
RMD	Dirverticulosis/Diverticulitis: inflammation/infection/ possible bleeding	Pitta	NA		Purisha VS	Antimicrobial Anti-inflammatory	Turmeric, Goldenseal Gaduchi, Turmeric

AA:Accumulation/Aggravation; O:Overflow; RMD: Relocation/Manifestation/Divercification; PPM: Past, possible, mild; MT: Mild & Transient

Prognosis:

Immediate treatment of Udara Roga is necessary before ascites is present. If treatment is neglected the vitiated doshas will further displace and become liquefied as a result of maturation causing sweat to be diverted from external channels of circulation into the abdomen and ascites will manifest. This can be cured if caught quickly, the patient is otherwise strong, and water has not started to accumulate in the abdomen. If however agni is reduced significantly this condition becomes incurable.[xliv]

Chikitsa (Therapy/Treatment) ~ Summary of Ayurvedic Management:

Charaka Samhita Vatodara treatment:

IF the patient is strong, they should begin with unctuous therapy: oleation (oil) and fomentation (heat), followed by purgation. Once the fecal matter is removed the abdomen should be wrapped tightly with a cloth to keep air from filling the space, Purgation therapy should continue everyday followed by samsarjana krama (moving from very thin gruel to a heavier diet very gradually). Milk can be given to promote strength, but if given for too long can cause nausea. This may be followed by vegetable or bone broth soup with sour herbs and salt to promote appetite. If flatulence occurs re-administer oleation and fomentation followed by an asthapana

(Niruha) basti (medicated decoction enema). If the patient suffers from itching, cramps, pain in the joints, sides of the chest, back or lumbar region, administration of anuvasana basti is recommenced using castor oil with sour herbs. If the patient is too weak, fragile, old or very young or if the dosha is overly aggravated then alleviation therapy should be given: medicated ghee, vegetable soup, meat or bone soup with rice for diet and therapies of Niruha basti, anuvasana basti, massage therapy and milk. [xlv]

Charaka Samhita Pittodara treatment:

If the patient is strong, start with purgation therapy; if weak elimination therapies link anuvasana basti prepared with oil or milk. After the patient regains strength and digestive power, oleation followed by purgation therapy is recommended:

1. Milk boiled with trivrt or castor-seed;
2. Milk boiled with satala (carmakasa) and trayamana
3. Milk boiled with aragvadha (fruit pulp)
4. If vata/pitta udara roga, use Trikaka ghrta with trivrt etc (Vide Chikitsa 7:140-150)

The patient should be given milk, medicated enema and purgation therapy repeatedly.[xlvi]

General Chikitsa and prevention:

Reverse the Nidana with diet & lifestyle: Routine, routine, routine!!!

Implement mindful eating practices; pausing before eating; eating in a relaxed, positive atmosphere; and learn about dosha specific diets from your ayurvedic practitioner.

Increase the elements of earth and water by bringing in warm, soft, moist, heavy, appropriate to digestive strength. Take Digestive support (Dipana) to regulate digestibility of foods.

Increase salt to soften stools and alleviate apana vayu.

Eat foods with sweet and sour tastes and Increase good quality oils/fats (Ghee) to nourish the rasa and mamsa dhatus (tissue) building strength to the colon wall.

Bowel and muscular tonics should also be used to strengthen and heal the tissue of the colon. Reduce bleeding and inflammation if present with anti-inflammatory herbs & hemostats (astringent herbs)

Soften the stool to reduce pressure on the colon wall using salts and laxatives.

Keep elimination regular using laxatives and purgatives as needed.

For diseases caused by the suppression of elimination urges such as flatus, feces, and urine, the treatment is rectal suppositories, oil massage, immersion baths and enemas. Laxatives and purgative in the form of food, herb and drinks will help with elimination. The intake of ghee (clarified butter) is recommended to restore natural lubrication and hydration to the body. [xlvii]

Regular daily exercise/movement: at least 30-min per day to promote peristalsis, and general muscle tone. Best exercises are yoga, tai chi, walking in nature, gentle weight lifting, and resistance training.

Reduce stress with daily meditation, pranayama (breath awareness and practices) if patient is strong enough and/or Yoga Nidra.

Herbal remedies:

Bowl tonics: Triphala taken in capsule or churna (powder) form, with a higher % of Haritaki to improve the tone of the colon wall and support strong peristalsis.

Shita Kshayai: cool infusion of triphala to maintain the tone of the colon and support daily elimination

Laxatives: as needed: Triphala and Cascara sangrada to encourage daily elimination.

Dipanas: to raise or balance agni (digestion) *Use cool dipanas with inflammation Coriander, Cumin, Fennel,

Demulcent Teas & Rasayanas: taken between meals to increase hydration and build ojas: 1 to 2 quarts of demulcent teach daily: Herbs: Slippery elm, licorice, marshmallow, and shatavari.

Chikitsa for Diverticulitis: Pitta/Vata flare-up:

Anti-microbial ~ broad spectrum:

Anti-bacterial- used during or after an active infection:

Pitta: Neem, goldenseal, kutki, gentian

Vata: Oregano, thyme, basil, Turmeric

Conclusion:

Western science and medicine have made many advances in understanding the anatomy & physiology of the human body at a cellular level and have gained proficiency in surgical procedure and pharmaceutical compounds; however, there are shortcomings to be held by this approach. Ayurveda gives us ancient wisdom in a holistic approach that can and should be used to prevent and treat uncomplicated diverticular disease. Ayurveda gives us the knowledge and tools to address dietary needs appropriate for each person and their respective dosha(s) and teaches lifestyle skills which lead to health, positive mental states, and enlightenment on several levels. Ayurveda helps us understand diverticular disease, shedding some light on the possible causes, preventions and

treatments for this condition used in conjunction with Western Medicine can treat conditions from mild to severe.

Notes:

[i] J Vermeulen, E Ven der harst, JF Lange, "Pathophysiology and prevention of diverticulitis and perforation" *Netherlands The Journal of Medicine*, 68 (10), (October 2010), 303.
[ii] Francisco Javier Medina-Fernández, Nélida Díaz-Jiménez, Ana Belén Gallardo-Herrera, Irene Gómez-Luque, Dimas Javier Garcilazo-Arsimendi and José Gómez-Barbadillo. "New trends in the management of diverticulitis and colonic direrticular disease," *Revista Espanola De Enfermedades Digestivas, Aran Ediciones,* 107 (3), (2015): 162.
[iii] L Strate, R Modi, E Cohen, and B Spiegel, "Diverticular disease as a chronic illness: evolving epidemiologic and clinical insights," *Am J Gastroenterol* 107, (2012): 1486.
[iv] A Tursi, "Diverticulosis today: unfashionable and still under-researched," *Therapeutic Advances in Gastroenterology*, 9(2), (2016): 214.
[v] Vermeulen, Ven der harst, Lange, "Pathophysiology and prevention of diverticulitis 307.
[vi] Ibid., 303-304.
[vii] Ibid., 304.
[viii] Ibid., 305.
[ix] F Hjern, A Wolk, N Hakansson, "Obesity, physical inactivity and colonic diverticular disease requiring hospitalizationin women: a prospective cohort study," *Am J Gastroenterol* 107, (2012): 296–302.
[x] Tursi, "Diverticulosis today: unfashionable and still under-researched," 213.
[xi] Vermeulen, Ven der harst, Lange, "Pathophysiology and prevention of diverticulitis," 303.
[xii] Fernández et al, "New trends in the management of diverticulitis," 165-168.
[xiii] Strate et al, "Diverticular disease as a chronic illness,"1486.
[xiv] E Kruse, & L Leifeld, "Prevention and Conservative Therapy of Diverticular Disease," *Viszeralmedizin,* 31(2), (2015): 103–104.
[xv] Strate et al, "Diverticular disease as a chronic illness,"1486.
[xvi] Kruse & Leifeld, "Prevention and Conservative Therapy ," 104.
[xvii] Ibid, 104
[xviii] Ibid, 104
[xix] FL Crowe, PN Appleby, NE Allen, TJ Key, "Diet and risk of diverticular disease in Oxford cohort of European Prospective Investigation into Cancer and Nutrition (EPIC): prospective study of British vegetarians and non-vegetarians." BMJ (2011): 343:d4131.
[xx] Kruse & Leifeld, "Prevention and Conservative Therapy ," 105.
[xxi]JLN Sastry, *Dravyaguna Vijnana: Fundamental Principles of Pharmacotherapeutics in Ayurveda,* (Chaukhambha Orientalia Varanasi), vol 1,Ch II, p 4-5.
[xxii] Mark Halpern, *Principles of Ayurvedic Medicine: Textbook for the Ayurvedic Profession, 10th edition*, (Nevada City, CA: California College of Ayurveda, 2012), 1-2.
[xxiii] Mark Halpern, "Principles and practices of ayurveda" http://www.ayurvedacollege.com/articles/drhalpern/Principles_practices, 1.
[xxiv] Mark Halpern, "Ayurveda & PRAKRUTI (the Constitution) and VIKRUTI (the Nature of the Imbalance)" http://www.ayurvedacollege.com/blog/ayurveda-prakruti-constitution-and-vikruti-nature-imbalance, 1.
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[xxvi] Ibid, 50-53.
[xxvii] Ibid, 148-157.

[xxviii] Ibid, 4-7.
[xxix] Ibid, 127.
[xxx] Ibid 128.
[xxxi] Srikantha Murthy, *Vagbhata's Astanga Hrdayam* (Varanasi: Chowkhamba Krishnadas Academy, 2016), volume 2, ch XII, p 113.
[xxxii] RK Sharma and Bhagwan Dah, *Charaka Samhita* (Varanasi: Chowkhamba Sanskrit Series Office, 2015), vol. III, ch XIII page 520-521.
[xxxiii] Murthy, *Vagbhata's Astanga Hrdayam*, vol 2, ch XII, p 115.
[xxxiv] Ibid, p116
[xxxv] Ibid, p 113.
[xxxvi] Sharma & Dah, *Charaka Samhita* p 525.
[xxxvii] Ibid, p 525-526.
[xxxviii] Srikantha Murthy, *Vagbhata's Astanga Hrdayam* (Varanasi: Chowkhamba Krishnadas Academy, 2016), volume 1, ch 4, p 45-46
[xxxix] Sharma & Dah, *Charaka Samhita* p 525-526.
[xl] Murthy, *Vagbhata's Astanga Hrdayam*, vol 1, ch 4, p 45-46
[xli] Sharma & Dah, *Charaka Samhita* p 527
[xlii] Ibid, p. 526.
[xliii] Ibid, p. 527.
[xliv] Ibid, p 535-538.
[xlv] Ibid, p 539-541.
[xlvi] Ibid, p541-542.
[xlvii] Halpern, *Principles of Ayurvedic Medicine: Textbook for the Ayurvedic Profession, 10th edition*, p1-55

Pathophysiology and prevention of diverticulitis and perforation

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A b s t r a c t
Objective: This article gives an overview of the current evidence and theories in the pathophysiology of diverticulosis, diverticulitis and perforation and discusses its prevention.
Background: Diverticular disease is one of the most common diseases related to the gastrointestinal tract in Western countries. The pathogenesis of this disease process is probably multifactorial, but remains poorly understood and inadequately investigated.
Methods: A literature search was performed in order to give an overview of the current evidence and theories in the pathophysiology of diverticula formation and the factors related to progression towards inflammation and even perforation. Strategies for prevention of (perforated) diverticulitis are also discussed.
Results/conclusion: The pathogenesis of diverticular disease and its complications seems to be a result of a complex interaction between exposure to a low-fibre diet, possible genetic influences, the coexistence of other bowel diseases and the impact of medicine use. This eventually leads to alterations in colonic pressures and motility and structural changes of the colon wall. Unfortunately the evidence is frequently conflicting in the present literature or lacking altogether.

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Prevention and Conservative Therapy of Diverticular Disease

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Keywords
Diverticulitis · Diverticular disease · Antibiotics ·
Mesalamine · Mesalazine · Dietary fiber

Summary
Background: Diverticular disease is a common problem. Prevention and treatment of complications depend on the stage of the disease. Lifestyle modifications are suitable preventive measures, aiming to reduce obesity and to balance the diet with a high amount of fiber and a low amount of meat. However, evidence to guide the pharmacological treatment of diverticular disease and diverticulitis is limited. Methods: Literature review. Results: Antibiotics are not proven to be effective in patients with uncomplicated diverticulitis and without further risk factors; neither do they improve treatment nor prevent complications. Mesalazine might have an effect on pain relief in diverticular disease even though it has no significant effect on the outcome of diverticulitis. In complicated diverticulitis, inpatient treatment including antibiotics is mandatory. Conclusion: Evidence for the treatment of diverticular disease is limited. Further research is needed.

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Diverticulosis today: unfashionable and still under-researched

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Antonio Tursi

***Abstract*:** Diverticulosis of the colon is a widespread disease, and its prevalence is increasing especially in the developing world. The underlying pathological mechanisms that cause the formation of colonic diverticula remain unclear but are likely to be the result of complex interactions among age, diet, genetic factors, colonic motility, and changes in colonic structure. The large majority of patients remain asymptomatic throughout their life, one fifth of them become symptomatic (developing the so-called 'diverticular disease') while only a minority of these will develop acute diverticulitis. The factors predicting the development of symptoms remain to be identified. Again, it is generally recognized that diverticular disease occurrence is probably related to complex interactions among colonic motility, diet, lifestyle, and genetic features. Changes in intestinal microflora due to low-fiber diet and consequent low-grade inflammation are thought to be one of the mechanisms responsible for symptoms occurrence of both diverticular disease and acute diverticulitis. Current therapeutic approaches with rifaximin and mesalazine to treat the symptoms seem to be promising. Antibiotic treatment is currently advised only in acute complicated diverticulitis, and no treatment has currently proven effective in preventing the recurrence of acute diverticulitis. Further studies are required in order to clarify the reasons why diverticulosis occurs and the factors triggering occurrence of symptoms. Moreover, the reasons why rifaximin and mesalazine work in symptomatic diverticular disease but not in acute diverticulitis are yet to be elucidated.

Keywords: acute diverticulitis, diverticulosis, epidemiology, pathogenesis, symptomatic uncomplicated diverticular disease, treatment

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REVIEW

New trends in the management of diverticulitis and colonic diverticular disease

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ABSTRACT
Colonic diverticular disease is a chronic disorder presenting witha variety of abdominal symptoms and recurrent episodes of acute diverticulitis. It is close linked to age so its prevalence has risen notably during the last decades in western countries, increasing costs related to medical attention. Recently, several works have provided evidence to a series of measures that could improve the outcomes as well as reduce expenses associated to this process.
The aim of the present review is to expose a view of the new trends in the management of diverticulitis and colonic diverticular disease,

based on the highest clinical evidence available.

Am J Gastroenterol. 2012 Oct;107(10):1486-93. doi: 10.1038/ajg.2012.194. Epub 2012 Jul 10.

Diverticular disease as a chronic illness: evolving epidemiologic and clinical insights.

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Author information

Abstract

Diverticular disease imposes a significant burden on Western and industrialized societies. The traditional pathogenesis model posits that low dietary fiber predisposes to diverticulosis, and fecalith obstruction prompts acute diverticulitis that is managed with broad-spectrum antibiotics or surgery. However, a growing body of knowledge is shifting the paradigm of diverticular disease from an acute surgical illness to a chronic bowel disorder composed of recurrent abdominal symptoms and considerable psychosocial impact. New research implicates a role for low-grade inflammation, sensory-motor nerve damage, and dysbiosis in a clinical picture that mimics irritable bowel syndrome (IBS) and even inflammatory bowel disease (IBD). Far from being an isolated event, acute diverticulitis may be the catalyst for chronic symptoms including abdominal pain, cramping, bloating, diarrhea, constipation, and "post-diverticulitis IBS." In addition, studies reveal lower health-related quality of life in patients with chronic diverticular disease vs. controls. Health-care providers should maintain a high index of suspicion for the multifaceted presentations of diverticular disease, and remain aware that it might contribute to long-term emotional distress beyond traditional diverticulitis attacks. These developments are prompting a shift in therapeutic approaches from widespread antimicrobials and supportive care to the use of probiotics, mesalamine, and gut-directed antibiotics. This review addresses the emerging literature regarding epidemiology, pathophysiology, and management of chronic, symptomatic diverticular disease, and provides current answers to common clinical questions.

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Obesity, physical inactivity, and colonic diverticular disease requiring hospitalization in women: a prospective cohort study.

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1
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Abstract

OBJECTIVES:

Lifestyle factors other than dietary fiber intake and risk for colonic diverticular disease have only been examined in few studies. The objective of this study was to investigate the association between obesity and physical inactivity and diverticular disease in a population-based cohort of women.

METHODS:

This was a prospective population-based cohort study. In all, 36,592 women, born 1914-1948, in the Swedish Mammography Cohort were followed 1997-2009. Body mass index (BMI; kg/m(2)), physical activity, diet,

smoking, and other lifestyle factors were collected at baseline through questionnaires. Cases of diverticular disease were identified from the Swedish Patient and Death Registers. Relative risks (RRs) of diverticular disease requiring hospitalization (or being the cause of death) according to BMI and physical activity were estimated using Cox proportional hazards models. The multivariable models were adjusted for age; intake of dietary fiber; diabetes; hypertension; use of acetylsalicylate acid, non-steroid anti-inflammatory drug, or steroid medication; alcohol consumption; smoking; and educational level.

RESULTS:

During 12 years, 626 cases of incident diverticular disease requiring hospitalization were found. Two women were registered in the National Death Register only. In multivariable analysis, women with BMI 25-29.99 had 29% increased risk (RR=1.29; 95% confidence interval (CI): 1.08, 1.54) and obese women (BMI≥30) had 33% (1.33; 95% CI: 1.03-1.72) increased risk of diverticular disease compared to women with BMI 20-24.99. Exercise ≤30 min/day increased the risk for disease with 42% (1.42; 95% CI: 1.18-1.69) compared with exercise >30 min/day in multivariable analysis. Ninety-eight subjects were hospitalized due to complications; perforation or abscess. Women with BMI≥30 had a twofold (RR=2.00; 95% CI: 1.08-3.73; P=0.028) increased risk for complicated disease.

CONCLUSIONS:

Overweight, obesity, and physical inactivity among women increase diverticular disease requiring hospitalization.

BMJ

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RESEARCH

Diet and risk of diverticular disease in Oxford cohort of European Prospective Investigation into Cancer and Nutrition (EPIC): prospective study of British vegetarians and non-vegetarians

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Abstract

Objective To examine the associations of a vegetarian diet and dietary fibre intake with risk of diverticular disease.

Design Prospective cohort study.

Setting The EPIC-Oxford study, a cohort of mainly health conscious participants recruited from around the United Kingdom.

Participants 47 033 men and women living in England or Scotland of whom 15 459 (33%) reported consuming a vegetarian diet.

Main outcome measures Diet group was assessed at baseline; intake of dietary fibre was estimated from a 130 item validated food frequency questionnaire. Cases of diverticular disease were identified through linkage with hospital records and death certificates. Hazard ratios and 95% confidence intervals for the risk of diverticular disease by diet group and fifths of intake of dietary fibre were estimated with multivariate Cox proportional hazards regression models.

Results After a mean follow-up time of 11.6 years, there were 812 cases of diverticular disease (806 admissions to hospital and six deaths). After adjustment for confounding variables, vegetarians had a 31% lower risk relative risk 0.69, 95% confidence interval 0.55 to 0.86) of diverticular disease compared with meat eaters. The cumulative probability of admission to hospital or death from diverticular disease between the ages of 50 and 70 for meat eaters was 4.4% compared with 3.0% for vegetarians. There was also an inverse association with dietary fibre intake; participants in the highest fifth (≥25.5 g/day for women and ≥26.1 g/day for men) had a 41% lower risk (0.59, 0.46 to 0.78; P<0.001 trend) compared with those in the lowest fifth (<14 g/day for both women and men). After mutual adjustment, both a vegetarian diet and a higher intake of fibre were significantly associated with a lower risk of diverticular disease.

Conclusions Consuming a vegetarian diet and a high intake of dietary fibre were both associated with a lower risk of admission to hospital or death from diverticular disease.