

Family Practice Grand Rounds

A Clinical Correlation Conference on Appendicitis

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The Clinical Correlation Conference at The Milton S. Hershey Medical Center of The Pennsylvania State University is a teaching method originated by the Department of Family and Community Medicine in 1967. In recent years, Correlation Conferences have been presented on a weekly basis during two of the three academic terms.

The conference is designed to enhance the relevance of basic science material for first and second year medical students. An attempt is made to present future clinicians with realistic and practical clinical situations which, of course, do not always follow textbook presentations or outcomes. Interpersonal relationships within the family and among health care providers are important to medical care outcome¹ and are regularly included in the Correlation Conference. The illness process and the relationships between the patient and the health care providers are viewed in as close to their natural state as possible.

This paper illustrates this educational method and represents an edited account of a conference on "Appendicitis" that was held in a large amphitheater in The Hershey Medical Center on October 11, 1973. The class was composed of first and second year medical students. The conference last-

ed 90 minutes and was recorded on color videotape.

The central person in the case presentation was Mike Snyder who was recovering from appendicitis. Four out of five members of the Snyder family were present. The mother, father, and a younger brother, Greg, were seated in front of the amphitheater. The oldest son, Douglas, could not be present. The physicians making the presentation included Dr. Hiram Wiest, the Snyder's family physician for 7 years, Dr. Donald Bley, the family medicine resident on call at the time Mike became ill, and Dr. Willis Willard, the faculty consultant on call at the time of initial contact with the patient. Dr. Rugh Henderson, a member of the teaching faculty, helped organize the Conference and provided the introductory statement.

Introduction

DR. HENDERSON: The situation that we are presenting today is similar to a type of problem that you will come across in the office of the family physician if you elect a primary care preceptorship. Before getting started, I want to thank the Snyder family for agreeing to participate at a time when they are in the process of coping with their son's illness. We can appreciate the fact that this is not the easiest time to discuss this problem before a group of medical students. We also appreciate the willingness of faculty members and a resident physician to participate in careful analysis of this case. The course of events has been complicated and not without some surprises.

A discussion of this case is consistent with our educational objectives because it illustrates several concepts important to your training. *First*, we would like to demonstrate that common problems are not necessarily simple problems. In dealing with a common problem, we should have a high index of suspicion or concern to compensate for familiarity with the problem. *Second*, we would like to trace the natural history of this problem as it developed and to emphasize the relationships among our staff, and the relationships within the family group. *Third*, we want to discuss abdominal pain in general, for this is a very common problem in most family practice settings. *Fourth*, we want to show that common problems, even when they are conscientiously approached by both the physician and the family, can result in complications. This case is a clear demonstration that in the real world everything does not turn out exactly as we would wish. With that introduction, I turn the conference over to Dr. Wiest and Dr. Bley.

DR. WIEST: We certainly appreciate the fact that nearly all of the Snyder family were able to come today. The oldest son, Douglas, who is 17, is absent, but we are glad that the rest of you could come. Mike, if you get too tired and want to leave at any time, please speak up. First I should say that I have known the Snyder family for the seven years that I have been practicing in Hershey. They have also played a part in the education of medical students. Dr. H. Theodore Harcke, a member of our first class,

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was assigned to the Snyder family at the time Mrs. Snyder was pregnant with Greg. She developed diabetes during her pregnancy, so Ted had the opportunity to see Greg delivered by cesarean section. Mr. Snyder and I have been in frequent consultation about a bad back. But, today, we are here to discuss Mike's abdominal pain and appendicitis.

Case Presentation

DR. WIEST: Mike, would you like to tell us when your pain started? (*Mike is wearing pajamas and is sitting in a wheelchair. He is receiving intravenous fluids through equipment attached to the wheelchair.*)

MIKE SNYDER: On Saturday night it started to hurt around 8 P.M.

DR. WIEST: Were you the only one in the family who was sick at that time?

MIKE SNYDER: Yes.

DR. WIEST: Had anyone else been having this type of pain?

MIKE SNYDER: No.

DR. WIEST: What did you do when the pain started?

MIKE SNYDER: Nothing, I just lay down. I took some Pepto-Bismal, but that didn't help any.

DR. WIEST: Where did the pain start? Do you remember where it was when it first began?

MIKE SNYDER: Just all over my "belly," just all over.

DR. WIEST: When did you finally decide that you better get something done about your "belly" pain?*

MIKE SNYDER: That was on Sunday afternoon, I think.

DR. WIEST: And what did you do then?

MIKE SNYDER: We went to the doctor.

DR. WIEST: And which doctor did you see?

MIKE SNYDER: Dr. Bley.

DR. WIEST: Dr. Bley, do you want to tell us what happened next?

DR. BLEY: Mrs. Snyder said that her son was having abdominal pain and I suggested that she bring him in. I saw him about 12:30 Sunday afternoon. He did have diffuse abdominal tenderness but no real localizing signs. His pain had not shifted significantly to

the right side. He had vomited three times and had a very low-grade fever. He had not had his appendix out and this was a consideration. Knowing that we were undergoing an epidemic of viral gastroenteritis in the community at the time, I thought Mike might be experiencing an attack of gastroenteritis. Mrs. Snyder asked whether she should give her son a laxative or enema and I cautioned her against this. I told Mike to restrict his oral intake, to rest, and to let me know later that day if the pain got worse. Later in the afternoon, and again the next day, I discussed the case with Dr. Willard. He was a little concerned that this had been going on so long and suggested that I call to find out how Mike was doing. Mike told me that he was still experiencing discomfort, but felt perhaps a little better. Later in the afternoon on Monday he became much worse and he came in to see Dr. Wiest.

DR. WIEST: Do you remember how things changed that Sunday night? Were you able to sleep?

MIKE SNYDER: No, not at all.

DR. WIEST: Did the pain change any during the night?

MIKE SNYDER: During the night it shifted to the one side.

DR. WIEST: Where did it shift to?

MIKE SNYDER: To the right side.

DR. WIEST: And did you tell your mother and dad that things were getting worse? Sometime Monday, did you tell them that you thought things were not doing so well?

MIKE SNYDER: I guess it was around 2 o'clock.

DR. WIEST: Monday afternoon? What were your parents' thinking at this time? Dad, what were your thoughts at this time?

MR. SNYDER: Well, he made me mad.

DR. WIEST: Why?

MR. SNYDER: Oh, he was getting up more, and throwing up often, and complaining about the hurting. We asked, "How bad are you?" I said, "Do you want to go to the doctor or should we call?" He said, "No." He didn't make up his own mind. Finally I said, "It's time."

DR. WIEST: Do you remember your visit to the office on Monday? Do you remember much about it?

MIKE SNYDER: Yes.

DR. WIEST: Do you remember

what happened in the office?

MIKE SNYDER: I got real bad chills and I guess I had a fever in the morning.

DR. WIEST: Initially, his temperature was recorded at 100 F, but while the nurses were preparing him for examination, he did start having a shaking chill. When I walked into the room, I felt his forehead and thought that he felt hotter than 100 F. When we checked his temperature again, it was actually 103.6 F by mouth. I examined his abdomen and by that time he did have classical signs of appendicitis. He had no peristaltic sounds when we listened to his abdomen. On deep palpation in the right lower side, he did have rebound tenderness. I thought, because he was so sick and because he was having chills and probably going to have surgery, that I would not do a rectal examination. We contacted a surgeon and sent him over to the emergency room where he was seen in surgical consultation.

DR. WIEST: How long did you wait in the emergency room? Do you remember?

MIKE SNYDER: I guess maybe an hour, I don't really know.

MRS. SNYDER: It was an hour and a half because the doctor had gone out the door. It was about an hour and a half.

DR. WIEST: What were you thinking then?

MRS. SNYDER: I didn't know how long it would be. The anesthesiologist assured me that everything was under control and that they were definitely going to operate.

DR. WIEST: At surgery they found a distended and inflamed appendix. They also found some fecaliths obstructing the lumen of the appendix and a small hole where perforation had occurred. There was a small amount of pus and an inflammatory reaction secondary to that. It was a retrocecal appendix which means it was tucked up in back of the cecum. What is the next thing you remember Mike?

MIKE SNYDER: I really don't know what happened.

DR. WIEST: The next day you remember feeling better or worse?

MIKE SNYDER: It was a lot better, I think.

DR. WIEST: And what did they do for you in the hospital during the first

*Technical terminology is usually avoided in these conferences so that the family and the first year medical students will be able to follow the discussion.

admission?

MIKE SNYDER: What do you mean?

DR. WIEST: How did they treat you? Remember intravenous fluids?

MIKE SNYDER: Yes, they did that and I was supposed to walk. I couldn't drink or eat anything. That is about it.

DR. WIEST: But you did feel gradually stronger and better?

MIKE SNYDER: Yes.

DR. WIEST: And how many days after the operation did you go home?

MIKE SNYDER: I guess six or seven. I am not sure.

DR. WIEST: Seven days later, just one week later. You were then free of fever and feeling good. Your bowels were moving and you were eating a regular diet. What happened next? I am not sure I know this next part of the saga.

MIKE SNYDER: I went home and I was feeling a little bit better. I couldn't walk very well, though, and then the next day I noticed a swelling on top of the cut (*incision*) and I had a fever.

DR. WIEST: And you were seen by the surgical resident on Tuesday night?

MIKE SNYDER: Yes.

MRS. SNYDER: About 11 P M.

DR. WIEST: And he was again admitted to the hospital. The wound had a lot of pus draining out of it since an abscess developed following the appendectomy. Do you feel better now since the thing has started draining?

MIKE SNYDER: A lot better.

DR. WIEST: How do your mother and father feel?

MRS. SNYDER: I knew something was not right, when he came home Monday — the way he walked and the pain, even while he was sitting or getting up, he had pain in the rectum and just looked so pale I knew something was not right but we let it go. I guess Tuesday night is when he said he really thought he was worse and right then he had a fever. I called the emergency service right away. First I called Family Medicine and they said to take him over to the surgeon on call.

DR. WIEST: Greg, did you miss your brother when he went back to the hospital?

GREG SNYDER: Yes, sometimes.

DR. WIEST: Do you fight with each other? Or are you good friends?

GREG SNYDER: Yes, sometimes.

DR. WIEST: Would anyone in the audience like to ask any questions at this point?

A STUDENT: How old are you?

MIKE SNYDER: Fifteen.

A STUDENT: Do you do your schoolwork while you are in the hospital?

MIKE SNYDER: I didn't make up any work yet. I'm not really worried about it, I'll make it up when I get out.

A STUDENT: You said you had trouble walking. Is that because you had weakness in your legs?

MIKE SNYDER: My legs were okay, it's just that I couldn't straighten up right. I couldn't stretch out the muscles very well and it was really sore when I stretched them.

DR. WIEST: Was it both legs or just one leg?

MIKE SNYDER: Just the one leg, the right leg.

A STUDENT: Were you feverish at that time?

MIKE SNYDER: No, I don't think so. No.

DR. WIEST: I think that Mike is describing a common situation after abdominal incision. He probably put tension on the skin and this hurts until the wound knits together well enough. People with abdominal surgery are pretty tender.

MRS. SNYDER: I might add one thing. He was worried that he was lopsided. We tried to explain to him that he was favoring one side because of the pain. This was making his body lean over. He couldn't understand this because he felt as if his whole body was just twisted.

DR. WIEST: Was this before surgery?

MRS. SNYDER: No, this was after he came home.

DR. WIEST: Did you have trouble walking before you were admitted because of pain in your right side?

MIKE SNYDER: Yes.

DR. WILLARD: Going back to the original illness, Sunday night through Monday, you described the shift in your pain. As the pain shifted, and after it shifted, do you recall a period when the pain seemed to be a little better?

MIKE SNYDER: Let me see. It shifted over and it wasn't really bad and that's when I felt better — but then it got worse.

DR. WILLARD: Sunday the pain was more diffuse and that's the day you called Dr. Bley for the first time. Then Sunday night you did not sleep because of pain and then Monday morning you described the pain as having shifted.

MIKE SNYDER: Yet, it was Monday morning.

DR. WILLARD: When the pain shifted, did you seem to feel better, the pain less discomfoting, and did you think "maybe this will blow over"?

MIKE SNYDER: Yes.

DR. WILLARD: When?

MIKE SNYDER: It was Monday morning. Then as the day went on, it got worse and in the afternoon we called Family Medicine.

DR. WILLARD: You saw Dr. Wiest then?

MIKE SNYDER: Yes.

DR. WILLARD: Early afternoon?

MIKE SNYDER: Yes, around 2 o'clock.

DR. WILLARD: At that time things were getting to feel a little worse?

MIKE SNYDER: Yes.

DR. WIEST: Mike wants to know if we know how much this is going to cost.

MRS. SNYDER: No, I don't. Just like everyone, it is covered by insurance — all but seven dollars which we have to pay.

MRS. SNYDER: We keep a little joke between us every time we come up to see Mike. We say it is costing us seven dollars a day and is going to be taken off his Christmas present. The first time it was \$49. So each time it is just taken off his Christmas present. In truth, the insurance pays for most of it.

DR. WIEST: I think we have kept Mike here long enough. We certainly appreciate having Mike and his family come to participate in this conference. Let's give Mike and the Snyders a nice round of applause. (*The Snyder family leaves the amphitheater.*)

DR. WIEST: I would like Dr. Bley to tell a little about the outcome of the situation and what this has meant to him as a physician.

DR. BLEY: When I first met you, your head was shaking and you were saying something to the effect that you had just learned Mike had been admitted to the hospital and had had

this "middle of the night" surgery. Yes, I agree that I did not pick it up on Sunday. Looking back on it, his signs were not clear cut. Perhaps I should have personally called him Sunday evening and asked him how he was doing and asked his mother how he was doing. But I had told them quite emphatically that if things got worse or if they were sure things were not getting better to please call me back. Having not heard anything throughout the rest of Sunday afternoon and Sunday evening while I was on call, I assumed that everything was doing well. I think one of the interesting things that came up was that this was such a hectic time for the family themselves; they were managing a busy campground at the height of the season. They had a lot of things going on, and they were quite preoccupied with their business along with the problem of having a sick son.

A STUDENT: Would it be safe to assume that most people in a similar situation would tend to underestimate the severity of their own problem or perhaps hesitate a little bit in getting back to the physician?

DR. BLEY: Are you talking about the patient — would he tend to underestimate?

A STUDENT: Right, he said he thought it would go away. I think that would probably be the reaction of most people.

DR. BLEY: I don't know. I would imagine so. I can tell you from personal experience that I waited 36 hours with a ruptured spleen before I had anything done with it. I was waiting for it to go away too. And this is what he was doing on Monday when I called him back.

DR. WILLARD: And you just caught him when things were momentarily better. I think we all expect these events to subside and this is the approach we frequently use. Also, I think this points out the fact that events taking place in the family situation may be influencing the patient's response to his problem.

Discussion

DR. WILLARD: This young man had a very difficult problem. A retrocecal appendicitis is notoriously difficult to discover early because the patients have relatively nonspecific, mild pain. Vomiting tends to be infre-

quent and there is often less abdominal wall guarding. Twenty-six percent of acute appendicitis cases are retrocecal.² That means that a quarter of the cases we are dealing with are subtle. In the best of hands, the correct preoperative diagnosis is made only 50 to 85 percent of the time.³ I think this supports Dr. Henderson's assertion that common problems are not necessarily simple. Appendicitis occurs in this country about 200,000 times a year. The rate may be even greater because it is increasingly evident that many people recover spontaneously from a mild case of appendicitis. In terms of age and sex spread for this disease: 18 percent of cases of appendicitis occur all the way from in utero to 12 years of age, 69 percent of cases between the ages of 13 and 39, and 12 percent of cases occur over the age of 39. Between the ages of 15 and 25, the male predominates two to one.⁴

Some comments about doctor-patient communication are relevant here; how does the patient get into your care? We are often limited by when the patient asks for help, and this a serious limitation because patients frequently wait a long time. Patients will ask many other people for help before us. Only when the condition persists or gets worse do they decide to "bother" a physician. I think it is important for us to recognize this natural and personal consultation sequence that precedes contact with the physician.

If a condition persists or worsens, initial contact with the physician is usually by telephone. First, the secretary answers and asks what the problem is. The patient or another member of the family will then describe the difficulty. Mrs. Jones may say that her daughter Suzie has not been feeling well and complains of pain in her stomach. The pain has been going on for three or four hours and she wants to know what she can do to make Suzie feel better. Hopefully the secretary or nurse will ask some further questions about the problem. Has Suzie been vomiting; has she had anything like this before; is anybody else sick in the family? A brief message is written and a request is made for you, the physician, to call Suzie's mother. When you call the patient back, Mrs. Jones is going to tell you that Suzie

has had some discomfort for four or five hours. She will remind you that Suzie had trouble last year when she first went to school, but then she got along fine. Suzie had also been in to see you last week for her annual physical and you said everything was just fine. Again, you will be asked what can be done to make Suzie feel better. This is the initial stage of communication with patient or parent.

We have a saying in medicine that when all else fails, we should *examine* the patient. It is important for you to convey this requirement to the patient or to the family. If pain has been going on for six hours or more, you must examine.⁵ Knowledge of intercurrent illness in the community is often helpful, but taking a careful history and doing a careful physical is essential.

A STUDENT: When you do get someone with a little stomach pain, how concerned should you be about the possibility of appendicitis?

DR. WILLARD: In our own practice, we see about one case every two months. When you see something that often, it is considered common and you develop a strong index of suspicion. Features of the patient's history will tend to raise or lower this index of suspicion.

A STUDENT: I just wonder what you would include in the list of alternative possibilities.

DR. WILLARD: Dr. Bley commented that he was thinking of something very common in the community and that was viral gastroenteritis. We have a lot of this here. So this condition also had a very high index of suspicion. Appendicitis can be a complication of viral illnesses due to lymphoid tissue obstructing the appendiceal lumen. Really, appendicitis can mimic just about any other disease or problem in the abdomen or in the chest. Pneumonia can present as an acute abdomen. A gall bladder down in the right iliac fossa mimics appendicitis. Any acute gynecologic disorder must also be considered. Porphyria, a metabolic disorder, can mimic appendicitis. Basically, the physician should be sensitive to: the history given by the patient; the physical exam; the patient's age and sex; and the family history. Remember, appendicitis tends to run in families.⁶

This disorder illustrates the extreme relevance of understanding certain

facts from embryology, anatomy, physiology, and pathology. From the standpoint of embryology, as you know, the intestine is derived from a disk of entoderm on the roof of the yolk sac. It reaches its final placement through a complex mechanism of counterclockwise rotations. The appendix, as part of the intestine, "flops" down counterclockwise from above. This is what happens 96 percent of the time. In a small fraction of cases, roughly 4 percent, the rotation is not complete and the cecum and appendix end up in the right upper quadrant of the abdomen. In a very small number of cases, about .03 percent, the cecum and appendix are over in the left lower quadrant. In less than 1 percent, the appendix lies in the left upper quadrant. Some .004 percent of patients have two appendices, and .008 percent have none at all.⁷ Of course, when you are dealing with a given person, you have no way of knowing about the presence or absence of these statistically rare events. You certainly do not know about these characteristics at the beginning of the disease process. But you do have epidemiological information for estimating probabilities.

The appendix itself then can lie in a variety of positions. The appendix can lie over the pelvic brim as well as in the retrocecal position. The location of the appendix is going to determine the character and the type of pain that occurs after there is parietal peritoneal irritation around the appendix and the visceral peritoneum. A large variety of pain patterns are possible. I have yet to see two identical cases of appendicitis.

The appendix usually becomes inflamed due to obstruction. I think appendicitis illustrates beautifully the pathophysiology of hollow tube obstruction. Any time you take a hollow viscus and obstruct it, a number of things happen. If it has a blind end, there will be an increase in intraluminal pressure. This, then, begins to shut off the flow of capillary blood resulting in ischemia. In the appendix, such a condition results in edema formation and accumulation of mucus and secretions inside the appendix. Any time a hollow viscus is obstructed, distension increases peristalsis in an attempt to propel out the obstructing objects. This produces the crampy

nature of the discomfort that often characterizes the very early symptoms of appendicitis — a very vague, almost imperceptible crampy discomfort. Because this represents true visceral pain, the discomfort radiates to the periumbilical area or to the low epigastrium. The patient does not perceive the pain down where the appendix is actually located. This stage in the development of appendicitis can last anywhere from several hours to several days. The literature describes an average of one to four hours for this process.⁸ I followed a patient once who was in this first stage for seven days before there were indications we could use to make a diagnosis. The diagnosis of appendicitis was confirmed during surgery.

Once a true visceral pain pattern has developed, the patient will often have some anorexia or loss of appetite. Frequently we learn that breakfast or supper was skipped because the patient just did not feel hungry. This seems to be the symptom that precedes the actual perception of nausea, and the nausea may or may not lead to vomiting. Very often there is a loose stool the day or two before, but not necessarily. Very often there is constipation, but not necessarily. This may depend in large part upon where the appendix is located. If it is retrocecal, the patient may have some diarrhea because the cecum and the ascending colon are irritated. If it is located away from the bowel, there may be constipation. If it is lying right over the ureter, the patient may have increased urinary frequency, and you may suspect that this patient is developing a urinary tract infection. The third stage of pain in appendicitis is known as the peritoneal cutaneous reflex pain of Morley. This means that the pain begins to localize where the appendix is actually situated and thus reflects the area of the parietal peritoneum directly involved.⁹

Now I would like to give some general comments about how you should approach the patient with abdominal pain. We made the point that the patient does have to be examined. I would urge you to remember this rule. There is an additional principle: "If you don't know what is wrong — don't treat." If you are going to be responsible for the care of the patient, you must examine the patient

when potentially serious symptoms persist and before you recommend treatment. I can assure you that there will be all kinds of reasons why you will be asked to prescribe by phone: "My husband has the car, I don't have any transportation. I was in just a week ago, everything was fine then. Can't you just prescribe something for me?" You have to take a firm stand and help this person appreciate that you must see what is happening. Occasionally, a patient will choose to go elsewhere or telephone another physician. You have to learn to accept and live with that prospect if you are going to practice the sort of medicine your patients deserve.

Let me give you another case in abbreviated form. Say you see Mrs. Jones and her daughter, Suzie, in the office late in the morning. You examine her. She has a soft abdomen and has lost some of her appetite, but there is no nausea or vomiting. She has no fever. Her pulse is normal. You get a blood count because it is wise in case of later problems to have a base-line blood count. The blood count comes back normal. The patient has diffuse abdominal pain but when you examine her, there is pain in the right lower quadrant. There is no rebound, but just pain on deep palpation and during some of the other maneuvers that are done to help identify the location of the appendix. All these findings are essentially negative or equivocal. So you ask Mrs. Jones to bring Suzie back later in the afternoon. You tell the patient not to eat anything, maybe a few sips of water, and to come back to be examined again at about 4 o'clock. Suzie comes back and at 4 o'clock her temperature is 99.4 F, her pulse rate is 86 per minute. The pain is a little more intense in the right lower quadrant. You then call a surgical consultant because you now suspect the patient of having appendicitis.

The case I just gave you actually happened in our office two weeks ago. This young girl had her appendix out that evening. The point to remember is the importance of careful and repeated examinations of the patient. You will have some families where you can trust a telephone follow-up. If you know the family well and they are reliable in taking temperatures and reporting changes, you may not need several office visits or house calls to

monitor a developing illness process. If there is any doubt in your mind, you should do an examination. This can mean three or four exams in a course of several days.

A STUDENT: I understand the cost of emergency room visits is \$20. Does the cost of a return visit influence your decision?

DR. WILLARD: All you can do is advise. As a physician, it is not your fault that the patient got ill, and it is not your fault that emergency room visits cost \$20. It is your responsibility to try to help this patient get the best care possible. If your professional judgment indicates that the patient needs to be reexamined and it is going to cost money, that's the way it is. I appreciate your concern about costs. It is a valid concern. It is something we all think about. I believe that an examination for this disorder is much more valuable than a \$50 battery of laboratory tests.

Twenty-five percent of all white blood counts in acute appendicitis cases are normal. In the 75 percent of cases with elevated blood counts, the elevation is often a very modest 11,000 to 13,000 total white blood count with a "shift to the left" of the

neutrophil morphology. But this occurs later on. You often call a consultant in when the blood count is still normal.

A STUDENT: Can we go back to the physical exam? Dr. Wiest said he did not do a rectal exam. Would you please comment on when to do a rectal exam.

DR. WILLARD: If you have an appendix that hangs over the pelvic brim into the pelvis and you can touch this appendix with your finger, you may be able to palpate a mass that is exquisitely tender. This must be distinguished from merely painfully distending the peritoneum by using the examining finger. Appendices can range in length anywhere from 2.5 to 22.5 centimeters and they can be located anywhere.¹⁰ I have seen them located under the ascending colon approaching the liver. The lumen ranges from 5 to 15 millimeters in diameter and can become obstructed readily. The method of obstruction is often a fecalith which is a combination of food particles, mucus, and bacteria. In the first recorded case of appendicitis in 1736, a common pin caused the perforation. Pinworms may obstruct the lumen as well as concretions

of various kinds. Tumors and congenital bands are also among the causes of obstruction which set off the whole process of stasis and infection. Whenever a hollow tube is obstructed, there is a serious possibility of infection. This principle also applies to the paranasal sinuses, the biliary tract, the urinary tract, and the pulmonary bronchial tree. This is a principle to keep in mind when you are dealing with various organ systems of the body.

Acknowledgment

We wish to express our appreciation to Mike Snyder and the members of his family for their willingness to participate in the conference and to give consent for the publication of this case report.

References

1. Conn HF, Rakel RE, Johnson TW (eds): *Family Practice*. Philadelphia, WB Saunders Company, 1973
2. Bockus HL: *Gastroenterology*, ed 2. Philadelphia, WB Saunders Company, 1964, vol 2, p 1090
3. Bockus: op. cit. p 1100
4. Bockus: op. cit. p 1092
5. Cope Z: *The Early Diagnosis of the Acute Abdomen*, ed 14. London, Oxford Medical Publications, 1972, p 3
6. Bockus: op. cit. pp 1092-1093
7. Bockus: op. cit. p 1090
8. Bockus: op. cit. p 1097
9. Ibid
10. Bockus: op. cit. p 601

