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PNEUMONIA AND PLEURISY IN EARLY LIFE SIMULATING APPENDICITIS.*

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Attention has been recently called in several quarters to the simulation of appendicitis or peritonitis by pulmonary processes, especially pneumonia and pleurisy. The fact that this simulation often occurred has long been known, but is commonly overlooked, and, inasmuch as the diagnosis is certainly at times extremely difficult, and since operation for appendicitis has even been performed when only pneumonia was present, I have thought it of interest to report a few cases of this nature and to quote those of like sort which have come to my notice in medical literature, limiting myself entirely, at least in detailing cases, to the occurrence of the condition in early life. It is, indeed, at this time that the confusion is most likely to happen, although some cases developing later in life are also met in literature.

Of the cases reported here the first two have already been detailed by me in previous publications; the others have not. Two of them occurred in the private practice of Dr. H. R. Wharton, and the notes of them were kindly given me by him.

CASE 1.—Mary Agnes McC., aged 8 years, admitted to St. Agnes' Hospital Oct. 27, 1893, suffering from chorea. On November 15 she became suddenly ill with very severe abdominal pain and tenderness and with such a marked appearance of some grave condition that the resident physician feared arsenical poisoning. The temperature was elevated, the pulse 170, and the respiration from 80 to 90 and very shallow. There was severe abdominal pain, with tenderness. The details of the condition as reported to me made me suspect peritonitis.

I examined her on November 16 and found that the abdomen was very much distended and tender; there was abdominal pain; the expression of the face was anxious, and the legs were held constantly drawn up in bed. The temperature had risen to 102. The rapidity of respiration combined with its shallowness appeared to be dependent on peritonitis, and several physicians who saw her with me agreed that this was the undoubted diagnosis. There was no cough. A physical examination of the lungs was made, however, as a routine, and to our surprise the upper part of the right lung was found to exhibit pneumonic consolidation. By the evening of the next day all abdominal symptoms had disappeared.

CASE 2.—Simon L., 4 years old, admitted to the Children's Hospital January 19, 1899. He was taken acutely ill on the 14th with obstinate constipation, abdominal pain and distension, and tenderness in the right iliac fossa. Cough was not

noted, if present. The physician who saw him had already made the diagnosis of appendicitis, but the child was admitted to the medical wards, inasmuch as operation had been forbidden by the parents.

On examination on the 20th the child was found evidently in much pain; had an anxious expression of face, shallow respiration of from about 30 to over 40 per minute, and held the legs drawn up most of the time. The abdomen was not distended, but was tender in the right iliac region and everywhere rigid enough to make palpation difficult. As far as it was possible to determine no tumor was present. The temperature varied from 103 to 105. Except for a few coarse râles, nothing could be detected on examining the lungs in front. Owing to the great distress of the child, and because the diagnosis of appendicitis seemed so positive, the posterior part of the chest was not examined on this date. On the next day, the 21st, pneumonic consolidation of the left lung was easily found. The abdominal symptoms remained unchanged. On the 22d all abdominal symptoms had disappeared. Crisis occurred on the 24th.

In neither of these cases was there apparently any reason to suspect anything but an appendicitis, or a peritonitis secondary to this. In the light of later experience, however, one sees that certain suspicious symptoms were present. The height of the fever in the second case, and, especially the rapidity of the respiration, ought to have rendered me more cautious in diagnosis. It is certain that in the second case the child would have been at once transferred to the surgical ward for operation if this had been permitted by the relations, and that operation might have been done if a more careful examination had not been made.

CASE 3.—Myer M., 6½ years old, admitted to the surgical ward of the Children's Hospital March 17, 1900, supposed to be suffering from appendicitis and pneumonia, having been ill two days. The exact nature of the symptoms previous to admission is not recorded.

Examination on the 18th showed the abdominal walls tense and everywhere tender, especially on the right side, where the rigidity and tenderness were especially marked. The respiration was from 45 to 55, the pulse over 130 and the temperature from 103 to 104. Breathing appeared to be painful. Examination of the lungs showed slight impairment of resonance over the upper lobe of the left lung in front and of the lower lobe behind, yet nothing very characteristic or diagnostically positive was discovered. On the 19th the temperature was 103, the respiration from 40 to 50. The abdomen was distended and tympanitic, and the epigastrium and the region of the appendix were tender on pressure, and the left iliac region to a less extent. Abdominal pain was constantly present, but less than on the preceding day. The expression of the face was that of pain; herpes was present on the lips; the chest was tender everywhere on percussion. No change in the pulmonary condition is recorded. On the 20th the child was much brighter. The abdominal symptoms persisted, and physical signs of pneumonia of the right lung were very positive. By March 21 all abdominal symptoms had disappeared. There were now, how-

* Read before the New Jersey State Medical Society.

ever, evidences of some degree of pneumonia in both lungs, and the temperature was falling. By the 23d it was normal.

This case was puzzling, not so much to determine the presence of a pneumonia, which was suspected before admission, but because it was considered that the disease was occurring conjointly with appendicitis. Operation was considered when he first entered the surgical ward. I was asked to see him on the 19th or 20th, and determined positively the presence of pneumonia. Experience with the earlier cases made me believe that the abdominal symptoms were referred entirely from the lungs. The later course of the disease appeared to render this unquestionable.

CASE 4.—K. S., male, 7 years old, admitted to the Children's Hospital Nov. 2, 1899, under the care of Dr. H. R. Wharton. He had had at various times more or less abdominal pain, but never severe until three weeks previously, when he had a typical attack of appendicitis as regarded by the physicians in charge of him. The symptoms at the time consisted of severe pain and tenderness in the right side of the abdomen, especially at McBurney's point, fever, constipation and restlessness. He recovered partially, but the tenderness is said to have remained. On October 30, three days before admission, he had had a recurrence of pain, and again on November 1. There had been no vomiting at any time. Fever was said to have persisted since the attack three weeks before. On admission the temperature was 103, respiration varying from 32 to 80, and the pulse from 132 to 196. The abdomen was distended, tender and somewhat rigid. These symptoms were especially marked on the right side. There was also bronchial respiration over the entire lower lobe of the left lung. The attending physician had in person taken the child to the hospital in order to have an operation for appendicitis performed. On refusal by the surgeon to do this he became very angry, disputed the diagnosis of pneumonia, said he had brought the child for the sake of operation solely, and would remove him if it was not performed, and used other language more forceful than polite. He was requested to go to the ward to examine the patient himself again. This he did—and then apologized.

By the evening of the same day the temperature had fallen to 99.2. No further abdominal symptoms were recorded, and the pneumonic consolidation rapidly disappeared.

This case hardly needs comment. It shows how absolutely one may be deceived by the pseudo-appendicular symptoms unless careful study of other parts of the body is made.

CASE 5.—Walter E. C., 11 years old, admitted to the Children's Hospital to the service of Dr. Wharton on Nov. 25, 1901. He was taken ill November 22 with vomiting, headache and pain in the abdomen. The latter soon became localized at McBurney's point and continued until the 24th, being so severe that he lay awake crying during the night of the 23d. There was fever and the bowels were constipated. Two well-known physicians of Philadelphia, one of them a surgeon, had seen him and made the diagnosis of appendicitis. On examination in the hospital the temperature ranged from 103 to 104 or more, the respiration from 40 to 55 and the pulse from 95 to 130. There were no certain symptoms of appendicitis discoverable, but a well-developed croupous pneumonia of the base of the right lung was found, and he was transferred to the medical ward to the service of Dr. F. A. Packard. By this time the principal pain complained of had shifted to the right shoulder. There was also pain in the right side and in the epigastrium, but none had been present in the right iliac region since the evening of the 24th. The epigastric pain persisted until the 27th, when the temperature fell by crisis. After this date the pain grew less.

By the time the child reached the hospital the change in the locality of the pain had removed some of the difficulty in diagnosis. It is to be noted that the physical signs of pneumonia were developed at the time of entrance.

The next case is not so characteristic an example of the likeness of appendicular pneumonia to appendicitis. The child was admitted, it is true, for appendicitis, but this diagnosis was promptly corrected.

CASE 6.—Elmer W., 8 years old, admitted to the Children's Hospital May 8, 1900, in the service of Dr. F. A. Packard. He had awakened in the early morning of May 4 with fever and vomiting. Constipation, fever and cough continued from this date. For two days there had been pain in the right side. Examination showed the eyes sunken, the knees drawn up, the abdomen distended but not tender, frequent cough, temperature 103, respiration from 35 to 45, pulse from 140 to 170, pain in the right side of the thorax, and physical signs of pneumonic consolidation of the right lung. The temperature fell by crisis on the 9th.

The only suspicious symptoms in this case were the sunken eyes, distended abdomen and the drawing up of the legs, pointing toward abdominal disease. The diagnosis, however, was unattended by difficulty.

The following two cases were seen by Dr. H. R. Wharton in his private practice, and kindly submitted to me by him.

CASE 7.—Boy 15 years old, seen in consultation, a diagnosis of appendicitis having been made, and Dr. Wharton having been called for the purpose of operating. There were pain in the right iliac fossa and continued high temperature. Examination showed some rigidity of the right rectus muscle, and much tenderness on pressure in the region of the appendix. Further examination, however, showed consolidation of the right lung. The presence of appendicitis was excluded. The abdominal symptoms promptly disappeared, and the child passed through an ordinary case of croupous pneumonia, terminating in recovery.

CASE 8.—Boy 8 years old, who for nearly a week had had severe abdominal pain, particularly in the right iliac fossa. Dr. Wharton was called in consultation on the sixth day of the disease, the diagnosis of appendicitis having been made and operation being desired. The symptoms pointed to disease of the appendix, but it was noticed that the respiration was quite rapid. Examination of the chest revealed the presence of pleural effusion. This later became purulent and ruptured into a bronchus, the symptoms of appendicitis meantime having disappeared. Resection of the rib and drainage of the empyema was required later. Recovery followed.

Cases occurring in children and reported in recent literature have been multiplying so rapidly that I can give but the briefest synopsis of those which have come to my notice. There is no doubt that a careful search of the older literature would show more extended references to the condition, with illustrative cases, than is ordinarily supposed.

1. Fenwick (*Lancet*, 1893, Vol. ii, p. 79) reports 1 case.

Boy of 13 years was suddenly attacked with severe abdominal pain, vomiting and faintness after a long walk. In a few hours he became delirious. On the next day he was found to have fever, with a temperature of from 102 to 106, pulse 36, herpes on the lips, rapid respiration, occasional short, dry cough, considerable abdominal pain and tenderness and rigidity, especially in the umbilical and left lumbar regions. The legs were drawn up in bed. Nothing abnormal was discovered in the chest. Vomiting continued troublesome, and the delirium gave place to stupor. On the third day all the symptoms improved greatly, and dulness at the left base behind, with impairment of the respiratory murmur, was discovered. Improvement continued, and the abdominal tenderness disappeared to a large extent. The temperature reached normal in three days. Later, pleural effusion was found.

Four other cases were reported, all in adults. In all the symptoms pointed distinctly toward inflammation in the abdomen, but the disease appeared to be dia-

phragmatic pleurisy. In two of the cases pleural effusion developed. In another the autopsy showed extensive involvement of the diaphragmatic pleura.

2. Morse (*Annals of Gynec. and Pediat.*, 1897) reports 3 cases.

(A) Boy of 7 years. A blow in the abdomen was followed soon by faintness, nausea and vomiting. The next day nausea, headache, pain in the abdomen, constipation, slight fever and slight abdominal distension and tenderness developed. Examination of the lungs was negative. The abdominal pain and tenderness increased, especially in the right iliac region, with slight dullness there. Respiration and pulse were rapid, the temperature was high, and there was a constant hacking cough. Appendicitis was suspected. On the fourth day of the attack physical signs of pneumonia were well marked over the right lower lobe, the abdominal symptoms disappearing.

(B) Boy of 8 years had headache, slight abdominal distension and tenderness, constipation, rapid respiration and a temperature of 105. Nothing was found in the lungs. Vomiting occurred in the night, and on the next day there was slight cough and the abdomen was much distended and tender, especially on the right side. The examination of the lungs was still negative. Up to the sixth day of the disease the condition was the same. On this date the respiration became more rapid and painful, the cough increased, pain in the chest developed, physical signs of pneumonia of the right lower and middle lobes were found, and all abdominal signs disappeared.

(C) Girl of 3 years, taken ill suddenly with fever and abdominal pain. On the next day she vomited, had continued abdominal pain, but no cough. Seen thirty-six hours after the onset, the temperature was found to be 39.9 C., the respiration and pulse rapid, but nothing abnormal was found in the lungs. On the fourth day of the attack solidification of the left lower lobe was discovered.

Morse considers the occurrence of pneumonia with initial abdominal symptoms not uncommon. He says that the abdomen has been twice opened for appendicitis in children within the past few years by prominent surgeons in Boston when the trouble was really pneumonia. He believes that the sudden onset with high fever and rapid respiration should suggest pneumonia, even in the presence of abdominal symptoms and the absence of cough.

3. Guinon (*Bull. de la Soc. de Paris.*, 1901, p. 77) reports one case.

Girl of 13½ years, had had fever, headache and pain in the right side of the chest for about eight days before admission to the hospital. On the day after admission she exhibited an anxious expression of face, sunken eyes, pain in the right side of the abdomen with tenderness at McBurney's point, little cough, no dyspnea, no physical signs in the chest. The case was supposed to be appendicitis, but firm pressure with the flat of the hand showed no tenderness and no increased resistance, although sudden pressure with the finger-tip gave pain. For two days more the diagnosis remained uncertain, pain persisted and positive signs of pneumonia were found at the right apex. The temperature fell by crisis in the evening, and on the next day the abdominal symptoms disappeared and the physical signs of pneumonia throughout the right lung were positive.

4. Massalongo (*Riforma Medica*, 1901, 711) says that he has observed 4 cases in children of from 5 to 12 years in which pneumonia simulated appendicitis. He recalls 5 cases in which operation for appendicitis was done and the organ found entirely sound, the real disease being pneumonia.

He calls the condition pseudo-appendicular pneumonia and dwells on the difficulty in diagnosis which lasts until after the third or fourth day, by which time the abdominal symptoms lessen and the physical signs of pneumonia are liable to be detected. The pain is

projected by way of the sympathetic and the spinal cord to the twelfth intercostal nerve.

5. Richardson (*Boston Med. and Surg. Jour.* 1901, April 17, p. 399) reports 5 cases in children.

(A.) Boy of 6 years, had for three days right lumbar pain, persistent vomiting and headache. On the third day a tense abdomen and right iliac tenderness were found, and the temperature was 105.5. On the fifth day the respiration was 40, the abdomen distended, the legs drawn up, the eyes sunken, and the general appearance bad. A diagnosis of appendicitis was made. On the sixth day the appendix was removed, but nothing of moment was found. Dyspnea and cough then developed, followed by empyema. He says that the case was one of pleurisy simulating appendicitis.

(B.) Boy 4 years old. On the second day there was abdominal pain, cough, and a temperature of 101, and appendicitis was thought of. On the third day pneumonia of the left lung was suspected. There was much pain in the epigastrium and in the left shoulder; the respiration was 42 and the temperature 105. On the fifth day symptoms suggestive of pneumonia, but not positive, were found. On the sixth day there was acute abdominal pain, constant in the region of the appendix. The abdomen was distended but not hard, with dullness in the right iliac region. The pain lasted several days and then disappeared. The final diagnosis was pneumonia of the left lung.

(C.) Girl, 5 years old, suddenly developed abdominal pain, which continued on the next day chiefly in the right iliac fossa, with a temperature of 104.4. Fever and pain diminished after ten days, but a little tenderness remained somewhat longer. About a week later pain and fever returned, appendicitis was thought of, and Dr. Richardson was summoned to operate. He found pneumonia of the right lung and tenderness along the course of the lower intercostal nerves. There had been no suspicion of the existence of pneumonia.

(D.) Boy of 4 years was attacked by cough, restlessness, fever, accelerated respiration, constipation and slight distension of abdomen. Nothing abnormal was found in the lungs. The condition continued, and on the eighth day the child developed abdominal pain, great tenderness over McBurney's point, and rapid respiration. Dr. Richardson was called in on the ninth day on account of suspected appendicitis. He found vomiting, severe abdominal pain, tenderness in the right iliac fossa, distension, but no rigidity. Operation was deferred. On the tenth day pneumonia was discovered, and the abdominal symptoms disappeared rapidly.

(E.) Girl of 7 years had had abdominal pain, fever, rapid respiration and cough for two days. On the third day the cough ceased, and on the fourth day severe abdominal pain developed, which disappeared, but left abdominal tenderness. Appendicitis and peritonitis were suspected. Examination on the fifth day showed tenderness over the appendix, no abdominal rigidity, a temperature of 104 to 105, and respiration of 40. The diagnosis was very uncertain, and operation was delayed. Signs of pneumonia were found the same evening.

Richardson also describes a case in an adult male brought to the hospital for abdominal operation. In a few days pneumonia was found.

He says that in acute right-sided diseases of the thorax the symptoms of appendicitis may be so simulated that a surgeon may be completely deceived. It was only his experience in the first case which kept him from operation in the others. The high temperature and rapid respiration are the most assuring symptoms.

6. Hampeln (*Zeitschr. f. Klin. Med.* 1902, 448) reports 5 cases, all in young adults and showing the most typical symptoms of sudden acute abdominal conditions. Collapse was present in some. In all the symptoms simulated peritonitis or intestinal occlusion.

7. Satullo (*Gaz. degli Ospedali*, 1902, xxiii, 757) reports 3 cases, all in adults. In all there was severe

pain in the right iliac fossa with an exceptionally high temperature, running from 43 to 44 C. at the maximum. It was only after several days of observation that the diagnosis of pneumonia was possible. Satullo designates the condition appendicular pneumonia, and says that pneumonia may begin with symptoms of acute appendicitis and the diagnosis be uncertain for three or four days. Pain at McBurney's point is reflex and is transmitted along the anterior branches of the twelfth intercostal nerve.

S. Barnard (*Transac. Clin. Soc. Lond.*, 1902, xxxv, 122) reports 2 cases in children.

(A.) Girl of 11 years, had had some abdominal pain with vomiting during three days. When seen on the fourth day the temperature was 103.6, the respiration 40 and painful; there was tenderness in the right iliac fossa, abdominal rigidity, and constipation. Four days after admission obscure signs of pneumonia of the right base were found. The temperature fell by crisis this day, but rose again, and signs of diaphragmatic pleurisy developed.

(B.) Boy 10 years old, had been ill for two days with abdominal pain and vomiting, following a blow on the abdomen and the lower part of the chest. He was admitted to the hospital for acute traumatic peritonitis. Examination showed the abdomen distended, rigid, tender; the legs drawn up; constipation; a temperature of 99.5, soon rising to 103; the respiration 44, and the throat negative. On the next day undoubted signs of pleuro-pneumonia of the right base were found. Empyema developed later.

Four other cases are reported; one in a girl of 17 and three in men, in which severe abdominal symptoms were produced by pneumonia or pleurisy. In the case of the girl the diagnosis of perforating gastric ulcer had been made, and operation was performed, but no signs of this condition were found. On the next day physical signs of pneumonia of the right base were found. In the case of one of the men operation was performed for supposed laceration of the spleen from trauma, the symptoms being due in reality to a traumatic pleurisy of the left side. The two other cases exhibited symptoms of peritonitis dependent on the presence of pyopneumothorax.

Barnard refers to the fact that the older writers recognized the simulation of abdominal diseases by pneumonia or pleurisy. He speaks of cases reported by Andral and Fagge. He says that the relaxation of the abdominal walls with each inspiration, the rapid respiration, the absence of weak or irregular pulse, the fact that the tenderness is superficial and disappears under firm pressure by the flat of the hand, and the sudden high elevation of temperature speak against peritonitis and for pulmonary disease.

9. Comby and Zielinski (*Arch. de Med. des Enf.* 1902, 741) report 1 case.

Boy of 8 years was attacked suddenly by vomiting, abdominal pain, constipation and fever. On the next day there was a temperature of 39.3 C., an anxious expression of face, pain and tenderness on the right side of the abdomen, no cough, and nothing abnormal in the lungs. On the fourth day vomiting and distension of the abdomen developed. Appendicitis was thought of, but beginning physical signs of pneumonia of the right side were found. Crisis occurred on the seventh day.

The writers caution against an early diagnosis based on what appear to be appendicular symptoms. There should be increased muscular resistance and deep induration to justify the diagnosis of appendicitis.

10. Cozzolino (*Gaz. degli Ospedali*, 1903, xxiv, 45) reports 1 case.

Girl of 3 years was suddenly attacked by high fever, severe abdominal pain, especially on the right side, vomiting and

anorexia. Examination on this day showed the child lying on the right side with thighs strongly flexed, great abdominal tenderness and pain, temperature of 39.7 C., pulse 150, rapid respiration, slight dyspnea, dry cough and constipation. She vomited during the examination. Practically nothing abnormal was found in the lungs. After much persuasion palpation of the abdomen was permitted; firm, steady pressure with the palm overcame the muscular contraction, and nothing abnormal was found at McBurney's point. On the next day the pain was slightly less; the cough little worse, and vomiting had ceased, and in the evening characteristic signs of beginning pneumonia of the right base were discovered. Abdominal pain slowly diminished, and disappeared by the sixth day.

He believes that pressure with the flat of the hand is a valuable aid in diagnosis, and dwells on the caution to be exercised in basing an opinion on the ordinary train of symptoms of appendicitis.

It is not necessary to review much further the individual cases or the general observations of the different writers as already quoted. There is evident a decided uniformity in most of the statements. They are in entire accord, too, with what the new cases I have reported show. There is, namely, especially in early life, a well-recognized, long-known, but frequently forgotten, tendency for patients with pneumonia or pleurisy to refer to the abdomen the pain really produced in the chest. This is more liable to happen when the disease is situated in the lower part of the thorax, but there is reason to believe that it may also occur when it has attacked the upper portion. It is also more deceptive when the right side of the thorax is affected, since the right side of the abdomen is then liable to exhibit pain, and the presence of appendicitis is suggested. Combined with the abdominal pain in these cases there is also constipation and abdominal tenderness and distension. These symptoms, together with the vomiting which quite commonly ushers in an attack of pneumonia in childhood, easily produce a clinical picture very closely simulating that of appendicitis.

The distinction is to be made by giving due consideration to (1) the sudden rise of temperature to 103 F. or thereabouts, and the tendency to maintain this degree; (2) the acceleration of respiration, which is out of proportion to the pulse rate or the pyrexia; (3) the relaxation of the abdominal walls between the respirations; (4) the diminution or the disappearance of tenderness on deep pressure with the flat of the hand; (5) the possible presence of cough. Finally, no operation for appendicitis should ever be performed until after a careful, or perhaps repeated, examination of the lungs has been made. All these points will, however, frequently fail to make the diagnosis certain, as the experience of some of the able observers quoted has shown.

Ozena of the Bronchi.—Béclère of Paris has observed several cases of a chronic bronchial affection similar to ozena of the nose. In some cases it was consecutive to measles, whooping cough or influenza, in others it was secondary to nasal ozena. In the majority the nasal passages were normal. All were improved or completely cured by intratracheal injections of peroxid of hydrogen and mentholized oil. Unilateral sclerosis of the lung with dilatation of the bronchi is the usual basis for the affection, as can be determined by radioscopy. If the latter is neglected the symptoms may suggest the erroneous diagnosis of a recurring vomica. The *Bull. Soc. Méd. des Hop.*, for June 25, contains Béclère's communication on the subject.