Occasionally the pain refers to the right shoulder
- Sometimes, early in embryological development, the colon doesn’t rotate as much as it should, and the appendix ends up in the right upper quadrant (or even on the left side of the belly)
- That malrotation isn’t necessarily a problem for the patient until the appendix becomes swollen with infection, irritating the diaphragm

- **Somatic pain**
  - Occurs with irritation of the parietal peritoneum
  - This is usually caused by
    - Infection
    - Chemical irritation
    - Another inflammatory process
  - Sensations are conducted by the peripheral nerves and are better localized than the visceral pain component
  - Often described as intense and constant
  - As disease processes evolve to peritoneal irritation with inflammation, better localization of the pain to the area of pathology generally occurs.

- **Referred Pain**
  - Cutaneous pain at site away from the pathologic location
  - Same embryologic origin (confluence of afferent nerve fiber from disparate area in the spinal cord)
  - For Example
    - Hepatobiliary pain
      - Refer to Rt scapular region
    - Subdiaphragmatic pain
      - Irritation of Rt diaphragm
      - Phrenic nerve (C4 cervical nerve root)
      - Pain in the left shoulder from splenic pathology (Kehr’s sign)
      - Intraabdominal collection, pleuritic chest pain
    - Back
      - Kidney
      - Aorta
      - Pancreas
      - Duodenum
    - Groin or genitalia
      - Ureter
      - Iliac arteries
  - Three cerebrospinal nerves, the phrenic, obturator and genitofemoral, are of particular importance because of the characteristic referred pain carried over these pathways in certain intra-abdominal conditions
    - Irritation, stretch, or injury of the dorsal or ventral aspects of the dome of the diaphragm produces referred pain in the supraclavicular fossa (Kehr’s sign) corresponding to the sensory branches of the phrenic nerve (C3 through C5)
    - Irritation of the genitofemoral nerve from such retroperitoneal inflammatory processes as retrocecal appendicitis or retroperitoneal perforation of the duodenum produces pain in the labia, testicle, or shaft of the penis on the involved side
    - Irritation of the obturator nerve in the obturator fossa, usually from an incarcerated obturator hernia, produces pain along the medial aspect of the thigh to the knee (Howship–Romberg’s sign)

<table>
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<tr>
<th>Structures</th>
<th>Nervous System Pathways</th>
<th>Sensory Level</th>
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<td>Liver, spleen and central part of diaphragm</td>
<td>Phrenic nerve</td>
<td>C3-5</td>
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<tr>
<td>Peripheral diaphragm, stomach, pancreas, gallbladder and small bowel</td>
<td>Celiac plexus and greater splanchnic nerve</td>
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<tr>
<td>Appendix, colon and pelvic viscera</td>
<td>Mesenteric plexus and lesser splanchnic nerve</td>
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<td>Sigmoid colon, rectum, kidney, ureters and testes</td>
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