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Angioedema: Reaction from ACE-Inhibitors
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Introduction
Angiotensin-converting enzyme inhibitors (ACEI) are medications used to treat the leading causes of angioedema in the United States, also known as ACE-RAs (Chan & Soliman, 2015). ACEI medications are frequently prescribed to help manage diseases, such as hypertension and congestive heart failure, and include, but are not limited to lisinopril and enalapril, with lisinopril being the most commonly prescribed at this time (Chan & Soliman, 2015). In addition, ACEI are used to help prevent myocardial infarction, diabetic neuropathy, and a cerebrovascular accident (Chipp, Grosswein, & Schweringer, 2011).

According to Luft et al. (2016), about 40 million people were taking ACEIs in 2000, with ACEI-RAs receiving only “0.1%-0.8%” (p. 206), less than six percent sounds like a rather small number; however, with such a large population taking ACEIs, the potential cases of related angioedema amount upwards to two million patients (Loftus et al., 2014). A true allergic reaction is one that involves histamines (Gang et al., 2013). A reaction, but is rather a potentially life threatening side effect from taking an ACEI (Chan & Soliman, 2015). While treatments and drugs that may be needed if icatibant is not effective, but are worth considering if icatibant in the United States, also known as ACEI RA (Chan & Soliman, 2015). ACEI are not an allergic reaction and should not be treated as such. Medications, such as icatibant, should be sent if available to improve patient outcomes.

Signs & Symptoms
The following are signs and symptoms associated with ACEI-RA, with a cough being one of the first symptoms a patient may notice, and should be a warning sign to healthcare providers that the patient may be experiencing a potential reaction to the ACEI (Chan & Soliman, 2015, p. 92). Also, potential risk factors for developing ACEI-RA is provided below (Bhaskar et al., 2014, p. 470).

- Cough
- Swelling (may be unilateral)
- Lips
- Tongue
- Face of mouth
- Larynx
- Difficulty Swallowing
- Drowsiness
- Hoarse Voice

Risk Factors
Female Gender
African American
History of Angiodema
Advanced Age
Chronic Diseases (such as, heart failure, diabetes mellitus, coronary artery disease)

Significance of Pathophysiology
Understanding the pathophysiology behind ACEI-RA is key to deciding if there is need to review the patient’s signs and symptoms, and prevent possible intubation or tracheostomy placement. While medications such as allopurinol, ibuprofen, naproxen, and/or steroids are typical treatments for true allergic reactions, these medications are ineffective for ACEI-RA, because it is not mediated by IgE or histamines (Gang et al., 2013). A medication called icatibant, which is administered only once subcutaneously at a dose of 30 mg, has proven to be extremely successful in treating ACEI-RA (Scalese & Reinaker, 2016). It blocks the receptor for bradykinin at the B2 receptor site. In doing so, the vasoactive effects of bradykinin are rendered completely ineffective, thus reducing the swelling and other associated symptoms. According to Scalese and Reinaker (2016), icatibant works within minutes of administration and can prevent tracheostomy procedures that otherwise may need to be done in order to ensure an effective airway.

Implications for Nursing Care
ACEI-RA is becoming a relatively common side effect, which has the potential to be severe in all clinical settings. Regarded bedside nursing, it is important to be able to promptly recognize the signs and symptoms of ACEI-RA. Healthcare providers may want to consider an alternative drug. All patients taking ACEIs need to be thoroughly educated about the signs and symptoms of ACEI-RA and what to do in the event of any of them. Lastly, all clinical healthcare professionals need to be aware that ACEI-RA is not an allergic reaction and should not be treated as such. Medications, such as icatibant, should be sent if available to improve patient outcomes.

Advanced practice nurses, particularly those who have prescribing authority, need to be aware of the risk factors associated with developing ACEI-RA and regularly screen patients taking ACEI for early warning signs, such as a chronic cough. For the risk of developing ACEI-RA is too high, the prescribed may want to consider an alternative drug. All patients taking ACEIs need to be thoroughly educated about the signs and symptoms of ACEI-RA and what to do in the event of any of them. Lastly, all clinical healthcare professionals need to be aware that ACEI-RA is not an allergic reaction and should not be treated as such. Medications, such as icatibant, should be sent if available to improve patient outcomes.

Conclusion
ACEIs are highly effective for treating several chronic diseases that would otherwise have a much higher morbidity and mortality rate (Chua et al., 2012). Despite the positive benefits of this medication class, the deleterious effects of angiotensin-2 receptor screening of patients taking ACEIs by healthcare providers and promoting awareness in patients and close family members. Therefore, the author strives to bring awareness to the signs, symptoms, and underlying pathophysiologic process of ACEI-RA.