Armageddon Medicine

How to treat resistant infections:

Pneumonia

Urinary tract infection

Resistant skin infection

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Q Welcome to Armageddon Medicine. Today's topic is "What to Do When Antibiotics Don't Work." Dr. Koelker, I've had times when an antibiotic hasn't helped a sinus infection, and the doctor had to give me a different one. Is that what we'll be discussing today?

A Your experience is familiar to most people – you get a cold, or bronchitis, or an earache. Maybe your doctor prescribes amoxicillin, but after several days you're no better, and your doctor changes it to a stronger one. However, that's only the tip of the iceberg. The biggest concern is life-threatening infections, which is what I'll address today, specifically: pneumonia, urinary tract infections, and severe skin infections.

Q Can we start with pneumonia? Everyone knows that can kill a person.

A Yes, excellent suggestion. First, what is pneumonia exactly? Most people don't understand the difference between pneumonia and bronchitis. Bronchitis is when the breathing tubes are infected or inflamed, but the infection has not reached the smallest divisions of the airways where the gas exchange actually occurs, that is, where oxygen is absorbed and carbon dioxide is expelled. Pneumonia is when these clusters of tiny balloon-like alveoli become filled with infection-tainted fluid, which blocks oxygen absorption.

Q So is there only one type of pneumonia?

A That's probably what most people think, but it is not actually the case. The most common type of pneumonia (community-acquired pneumococcal pneumonia) is usually curable, but untreated it can easily kill people, especially the elderly, the very young, and the otherwise weakened.

Other common types of pneumonia include viral pneumonia (including influenza pneumonia), pure aspiration pneumonia (caused by inhaling food, saliva, or upper airway secretions), and the so-called atypical pneumonia. Nowadays doctors use X-rays and fancy tests to tell the difference, which may not be available in an uncertain future.

Q So is it possible to diagnose pneumonia without an X-ray?

A It can be difficult, but not impossible. Let me interject that prevention is far easier than treatment. Everyone should receive an annual flu vaccine, and anyone with a predisposition to pneumonia or with an underlying weakness should also receive at least a one-time pneumonia vaccine. This includes the elderly, babies, people with asthma, COPD, diabetes, heart disease, and any other chronic disease that impacts health, breathing, or immunity on a regular basis.

Q Does the pneumonia vaccine prevent all pneumonia?

A No, but it does lessen the risk of the most common type of pneumonia. So let me describe a typical case. A few years ago my nephew got sick, I think it was April 2009. His illness started with a cough, aches, and flu-like symptoms. In retrospect, it would be easy enough to postulate that he had the H1N1 influenza – however, it had not yet been recognized at that time. Next his chest started hurting, his cough worsened and became productive (coughing up yellow phlem), and he became short of breath. In short, at age 25, he felt like he was dying. He ended up going to ER and had a chest X-ray which showed pneumonia. He was admitted and treated with IV antibiotics, oxygen, and breathing treatments for several days.

Q What would have happened if hospital treatment wasn't available? What happens if a person has pneumonia and they don't receive antibiotics?

A In my nephew's case, he may well have died. At the very least he would have been sick for weeks to months. But that brings up an important point. We're discussing situations when antibiotics don't work. In the case of pneumonia, antibiotics ALONE often do not work. A patient also needs an intact immune system, hydration, and supplementary medications, often including oxygen. Without a good immune system, even with antibiotics the patient will often die (as is the case with AIDS).

For example: pneumonia patients often lose their appetite and consume too little fluids. They become dehydrated, which makes for thicker mucus. Overall weakness leads to weaker muscles for breathing and inability to cough out the secretions.

Patients may also have underlying problems, such as asthma, emphysema, or chronic bronchitis (smoking-related COPD), which may necessitate inhalers such as albuterol (Proventil or Ventolin, or lacking those, Primatene Mist); steroids (prednisone 40-60 mg daily), chest percussion, and bed positioning with the head of the bed elevated.

Diabetics may experience elevated blood sugars, sometimes to dangerous levels, or conversely, low blood sugars if medication is continued but food intake decreases, also dehydration and poor or delayed healing.

Q **So one thing you're saying is, if it seems like an antibiotic isn't working, a patient or caregiver should look at the whole picture and consider whether something else should be done.**

A That's exactly right. For example, I didn't mention that my nephew has asthma. When he had pneumonia, even with the proper antibiotic he may have died if he hadn't been treated with bronchodilators, steroids, and oxygen. He also wasn't eating well and was given IV's.

A big question is, can these other treatments be administered outside the hospital? Most of the time the answer is yes, but it requires thinking ahead, having these medications on hand, and having a dedicated caregiver who can expect to do everything an entire hospital staff does. It's not easy, but it can be done.

Q Does that mean everyone should have these medications on hand?

A I'd say everyone should have a supply of antibiotics on hand, which is another whole topic, which I address at length in my book, *Armageddon Medicine*. Anyone with breathing problems should acquire an extra supply of any medicines they use on a regular or intermittent basis, including inhalers, corticosteroids, oxygen or an oxygen concentrator, possibly a nebulizer, and a back-up power supply. If you can't acquire these, you should at least have on hand the weaker bronchodilators: Primatene (pills or mist), pseudoephedrine, caffeine (which is related to aminophylline, an old-time asthma medicine). And anyone can learn how to do chest percussion, which I also describe in detail in my textbook.

Q Can you spend a minute explaining a little more how to diagnose pneumonia?

A Sure. Typical symptoms of pneumonia include cough and fever, especially with community-acquired pneumonia. But these symptoms are non-specific. The differential diagnosis (that is, other conditions to consider) includes a bad cold, pneumonia, bronchitis, pleurisy, influenza, anthrax, a cold plus asthma, congestive heart failure, pulmonary embolism (blood clot in the lungs), an inhaled foreign body, aspiration, chemical inhalation, along with less common conditions.

Q So how do you tell the difference?

A When a person has a cough plus fever, the most common questions are

1. Is this viral or bacterial?
2. Is this pneumonia?

The other conditions mentioned above should be considered, especially in the elderly or the very young, but are less common.

With bronchitis, wheezing is prominent. If discomfort is present, it tends to be centrally-located, that is, in the main bronchial tubes. The chest tends have some coarse rattles, but rales (see below) are not present. Bronchitis also tends to occur in younger patients, and is fairly common in otherwise healthy individuals. Again, those with asthma or COPD become quite wheeze with a bout of bronchitis. Loss of appetite is less severe than with pneumonia, and fever tends to be mild.

Influenza is similar, but patients tend to have more body aches, feel very tired, and have a dry cough. The onset is often quick, and other members of the community are usually sick as well.

The pneumonia patient appears sicker over all (but not always). Without treatment, the patient tends to become progressively worse. One-sided chest pain may be present, breathing may be fast and shallow, and fever may be higher than with bronchitis. The characteristic hallmark of pneumonia is rales, though these cannot always be heard with a centrally-located pneumonia. Rales is the sound of tiny bubbles popping in the alveoli; they sound very much like a lock of hair being rubbed together between the fingers (check this out on your own)

So altogether you can see this is not a black and white question. If you seriously suspect pneumonia, it is better to be safe than to be sorry. The strongest oral antibiotics include Augmentin, Biaxin, Levaquin, and Avelox. In a chronically ill patient, or one with underlying asthma or COPD, using a strong antibiotic is in order. In a younger, healthier person who exhibits rales, chest pain, fever, and perhaps shortness of breath or rapid breathing these also could be used, but if you don't have them on hand (which you may not, since they are among the more expensive antibiotics), then use any of the following that you have on hand: amoxicillin, penicillin, trimethoprim-sulfamethoxazole, doxycycline, erythromycin, cephalexin, or tetracycline.

Q So say your wife gets sick and you start her on amoxicillin, and you try to do everything else we've been discussing but she's not getting better. How much time should you give it? And what should you do if she's actually getting worse?

A This brings us to the heart of the matter. First, let me again say that it's always worth re-thinking the diagnosis. When my nephew was sick, H1N1 had not yet been identified, though a few weeks later it was. Looking back, I think he started with this. Had he been treated for influenza at that point, he may not have developed pneumonia. This again points to how important it is to observe patterns in the community. Unfortunately, it's often the case that a few people must die before this happens. Also, my nephew had not had an influenza vaccine – though this would hardly have helped, since the annual vaccine did not actually include the H1N1 strain, and a second vaccine had to be developed.

Q But assuming the diagnosis is correct and the antibiotic you're using is not working, what's the next step?

A This brings up 2 points: antibiotic resistance and atypical pneumonia.
Atypical or mycoplasma pneumonia tends to occur in younger folks; it usually occurs bilaterally (in both lungs at once) and may not exhibit the hallmark sign of rales. Pencillin-type medications are not effective (penicillin, amoxicillin, cephalexin), though macrolide antibiotics are. If you're using a penicillin and it isn't working, then switching to erythromycin, azithromycin (Z-Pak), clarithromycin (Biaxin), or a tetracycline (or doxycycline) may be effective.

Regarding resistance, any pneumonia can be resistant to any drug. Typical pneumonia is caused by the pneumococcus, but especially in elderly pneumonia may be caused by Klebsiella, E. coli, or even MRSA (methicillin-resistant Staph aureus). However, without a microbiologist, you're not likely to know. A doctor could do a Gram stain, but even that gives limited information.

Q Are there some basic rules you could offer on changing antibiotics then?

A Yes. Even without knowing exactly what organism you're treating, if the first antibiotic doesn't work you can make an educated guess. Of course, you did ask, how long should you give it, that is to say, how will it take to know if an antibiotic is working?

Generally speaking, it takes *at least* 24 hours to see any difference, and often longer. If a patient's condition is not deteriorating, I would give an antibiotic a good 3–5 days to see if it's helping. The first sign that an antibiotic is helping is that the condition is not worsening. So if a patient is sick but stable, you could continue the same antibiotic and wait a few days longer to observe for improvement.

But if a patient is getting sicker, I'd only wait a day or 2 or 3 before considering a change in antibiotics. That brings up another point: if a patient is extremely ill, you might want to use a combination of antibiotics right from the beginning. For hospitalized patients doctors commonly use expensive antibiotics until culture results are available, but a culture is not always necessary (and likely won't be available if you're on your own). For example, amoxicillin plus erythromycin should be effective most of the time. There's little sense combining 2 types of penicillin drugs, but combining antibiotics from different classes covers most of the common organisms.

Antibiotics are divided into different classes, depending on how they work:
The **penicillin-type drugs** include: amoxicillin, ampicillin, penicillin, Augmentin, cephalexin, and other cephalosporins (so it makes no sense to use amoxicillin plus cephalexin, for example)
The **macrolide drugs** include erythromycin, clarithromycin azithromycin (so don't combine these)
The **quinolones** include ciprofloxacin (which is the weakest but cheapest), Levaquin, and Avelox
Others sometimes useful drugs include TMP-SMX (Septra, Bactrim) for MRSA and the tetracyclines.

Q So if one class of drugs is not using, you should switch to another?

A Yes, that's usually how it's done, though in quite a sick patient, they would be used in combination.

Good combinations include:

A penicillin plus a macrolide

Cephalexin plus a sulfa drug (Septra or Bactrim) (especially for suspected MRSA)

Possibly a sulfa drug plus a tetracycline

Possibly a macrolide plus a sulfa drug

Avelox and Levaquin are usually used as single agents.

Q And what if the combination still doesn't work?

A Without a culture or advanced blood testing, it's impossible to know exactly what you're dealing with. The strongest, most consistently reliable antibiotics are Augmentin, Biaxin, Levaquin, and Avelox. It's rare that these are used in combination, though that is a possibility. If you have any of these on hand, you may want to use them. This is one of those life-threatening emergencies when the strongest antibiotics SHOULD be considered. Don't use them up on colds and earaches.
If you're using amoxicillin plus erythromycin and the combination is not working, I'd add or switch to ciprofloxacin or a sulfa drug to cover possible MRSA or resistant Gram-negative bacteria. Another option is switching to doxycycline plus ciprofloxacin or a sulfa drug.

Q Could it just be a bad case of the flu?

A Yes, if influenza is in the community, or if the pneumonia is not clearly one-sided you may want to treat with Tamiflu (75 mg twice daily for 5 days) in addition to the antibiotic.

Q When people die of pneumonia, what is it that actually kills them?

A It can be a number of things. First, the lungs may fill with mucus, which prevents oxygen from entering the blood stream and in effect, the patient drowns in his own secretions. Other times the bacteria enter the blood stream and distribute infection throughout the entire body.

As I said before, patients can easily become dehydrated with pneumonia and die from this. If you're caring for a patient with pneumonia, you must make sure they are drinking plenty of fluids and that they still are putting out urine. You may need to use a nausea drug to help a patient drink more. The best OTC option is meclizine (Bonine, Dramamine) or prescription meclizine, Phenergan, or Vistaril. Marijuana also works for nausea and vomiting, as most people know. (This is illegal in Ohio.) If a person can't take fluids my mouth, an IV may be necessary, but again, that's another discussion.

Q Can you give me any idea how many people can survive pneumonia without being hospitalized?

A I'd say the answer depends mostly on their pre-existing health. People with lung disease or anyone who is physically feeble is at great risk. It also depends on very close monitoring by a caregiver. Overall, with appropriate care, I'd say at least 90% of patients could be treated at home using everything we've discussed. But the patient who is totally on their own without access to antibiotics and other medications may well not make it.

Q So anyone listening who's at risk should really make sure they prepare ahead of time, and get the pneumonia vaccine, right? Is there anything else about pneumonia you'd like to add?

A The person at greatest of risk of dying from pneumonia is someone who has trouble swallowing, especially patients who have had a stroke or feeble patients who experience vomiting or reflux. Babies are at risk, too, and ideally would be treated by someone with medical knowledge.

Q Thank you, Dr. Koelker. Now at the beginning of this discussion you mentioned a few other life-threatening infections. What about urinary infections – can a person die of that?

A It's more common than you would think, and probably THE most common cause of death in nursing home patients.

Q Why is that?

A To start with, the problem begins with making the diagnosis.

In a younger person, typical symptoms of urinary infection include: dysuria (pain on urination), frequent urination, and abdominal discomfort. For kidney infections, back pain and fever may also be present. Either bladder or kidney infection may produce nausea or decreased appetite.
So in younger folks, these infections give lots of warning. Infections are caught before they progress to serious kidney infections, which may lead to sepsis. Also, younger folks drink more fluids, and are more apt to recognize something's wrong; they also don't attribute their problems to old age.

Older folks may lack warning symptoms altogether – they may simply "feel bad" and may not complain at all – they simply deteriorate. Some patients exhibit confusion as the only symptom. I have a patient I can diagnose across the room based merely on his degree of confusion.

Q When does a urinary infection become life-threatening and how can that kill a person?

A In women, a typical infection may progress from a bladder infection, to kidney infection, to sepsis (that is, infection spread throughout the body via the blood stream).

In men, there are no so-called "simple bladder infections" - something else is usually wrong: either an obstruction (due to an enlarged prostate or kidney stone) or possibly a neurologic problem.

Though infection is more common in women, they may be easier to cure. In men, prostate infections tend to be recurrent and to require prolonged periods of antibiotic treatment to resolve completely (which may deplete your stock of antibiotics, and is something to consider).

Q Are you saying you shouldn't treat certain people with urinary tract infections?

A That's a difficult question that you should consider now while options exist. For example, nowadays men often take medication for years rather than undergo definite surgery (such as a "TURP"). However, if these medications will not be available for years to come, surgery is a consideration. Also, if, say, a prostate infection is uncomfortable but not life-threatening, not treating with antibiotics is a consideration, since treatment may require hundreds or thousands of doses – if you suffer from this condition, it's best to lay in a goodly supply of ciprofloxacin, TMP-SMX, or

nitrofurantoin, or possibly doxycycline. Amoxicillin may help but is not dependable for prostate infection.

Regarding rationing of care, the biggest question is how far to go when treating elderly or debilitated patients? In our current society – we treat, though many elderly patients with poor quality of life choose not to. Family members may choose not to treat a patient with severe Alzheimer's or a stroke victim. What you do will depend on your resources, your need for mobility, your number of caregivers, and your overall situation.

Q Other than symptoms, are there any simple tests to diagnose a urine infection?

A Yes, anyone can purchase test strips on Amazon or other sites that check for WBCs, RBCs, and nitrites in urine. Also, though not a perfect test, cloudy or smelly urine may be a tip-off. Also, if you have the means, you could look under a microscope. For this you need a clean-catch urine, to avoid contamination with skin germs. Folks besides doctors could perform microscopic urine examination – high school science teachers, lab techs, or nurses, for example. CLIA laws have taken this test out of the hands of most doctors, but the skill is not that difficult to reacquire.

Q Earlier you said bronchitis or influenza may mimic pneumonia. What about urinary tract infections?

A The most common considerations are kidney stones and the enlarged prostate. Kidney stones can occur in patients of either sex, and are more common in middle-aged people and older. Small stones will pass on their own; larger ones may obstruct or even kill a kidney, or may lead to sepsis.

In men, an enlarged prostate may yield symptoms of frequent urination, nighttime urination, difficulty initiating urination, or dribbling afterward, but usually there is no pain or burning, and symptoms do not worsen over short period of time (days to weeks), though infection of the prostate may give similar symptoms. Fortunately, antibiotics that treat urinary infections are the same as those used for the prostate.

Q So what antibiotics are best for a urine infection, and what should you do if those don't work?

A Treating urinary infections is as much an art as a science.

- Sometimes treating early is best – 1 pill or 1 day of medicine may prevent severe infection – and some patients know what is best for them.
- Other times, treating only with extra fluids (and possibly cranberries) to flush out the infection is effective.
- Still other times, treatment for 3–10 days is necessary – or even longer for worse or persistent infections

As for what antibiotics to use – again, you can't know for sure. It is usually reasonable to begin with TMP-SMX, ciprofloxacin, or nitrofurantoin. If these are not available, then amoxicillin, cephalexin, or doxycycline may be used, though these are less reliable.

The strongest antibiotics for urinary infection are generally Levaquin, maybe Avelox, Augmentin, and possibly ciprofloxacin. If one class of medication doesn't work, then switching to another class is indicated (see above).

The most common questions are:

1. Could this be a kidney stone instead?
2. Is this a bladder infection (usually not serious) or a kidney infection (potentially deadly)?

Again, kidney infections commonly cause back pain, nausea, fever, and the patient looks truly sick. And again, all these signs may be missing in the elderly.

Q Like pneumonia, are there other things to do besides taking antibiotics?

A Definitely – drinking plenty of extra fluids will help flush out infection and prevent dehydration; they can also help a kidney stone to pass. As much as a gallon of water a day may be necessary. Anti-nausea medications (meclizine, Bonine, Dramamine) can be useful, as well as mild to moderate pain relievers.

Q Before we run out of time, can we talk about skin infections briefly?

A Yes. For most skin infections the best antibiotics are still Augmentin and cephalexin, or other cephalosporins such as Omnicef. Again, to know if they're working, you first need to observe whether a patient has stopped deteriorating, which you should know by day 2 or 3 of antibiotic therapy. Improvement should begin within 24–72 hours. If the patient is worsening, you may be dealing with two common things: abscess formation or resistant bacteria.

Q What exactly is an abscess?

A An abscess is a pocket of pus, more like a water balloon than a sponge. Infected sebaceous cysts are probably as common as abscesses and look much the same.

For example, this past week saw patient with a tender, red, lump on her cheek. At first no "head" could be seen on the infection (no pocket of pus to pop); the infection was like a hard, infection-filled sponge. At this point I gave her antibiotics, hoping we caught the infection early enough to prevent abscess formation. However, two days later she returned with a "pointing lesion" (a visible pocket of pus), ready to lance. When lanced, initially pus drained out, followed by pearly white sebaceous material. The patient experienced immediate relief – within minutes – and by the time she left my office, she looked at least 50% better. In a situation like this it is vital to keep the lanced lesion open to heal from the bottom up. If an abscess closes over, the infection may re-accumulate and the entire process may need to be repeated.

Q I've heard a lot about MRSA (mersa) lately. What exactly is that, and is the treatment different?

A MRSA is methicillin-resistant *Staph aureus*, which seems to occur in two types: hospital-acquired and community-acquired. The problem with MRSA is that traditionally-used antibiotics are not useful. Hospitalized patients may require IV vancomycin, which is not used orally for skin infections. For outpatients, if cephalexin or Augmentin are not working for a skin infection, then consider adding or switching to Septra, doxycycline, or ciprofloxacin. Without a culture you simply can't know which is best. If needed you can also use Septra or ciprofloxacin plus doxycycline, or possibly

cephalexin plus Septra, which is usually effective and covers both "normal" staph and resistant staph infections.

Q I'm afraid our time is gone for today. Are there any final tips you'd like to offer our readers, Dr. Koelker?

A I know this is a lot of ground to cover, and I'd advise reading this transcript or listening to the recording more than once. I also address these topics and many more in great detail in the textbook, *Armageddon Medicine* (available at www.armageddonmedicine.net). Thanks for helping get the word out.