THE NORTHERN HOSPITAL

SHIGELLOSIS

Captive Union soldiers, Andersonville Prison Camp, Georgia, c.1864.

"My heart aches for these poor wretches, Yankees though they are, and I am afraid God will suffer some terrible retribution to fall upon us for letting such things happen. If the Yankees should ever come to southwest Georgia and go to Andersonville and see the graves there, God have mercy on the land!".....

Eliza Frances Andrews

Out west, bloody Bill Anderson, a Confederate guerrilla who rode with Union scalps tied to his bridle, led 30 men into Centralia, Missouri, killed 24 unarmed Federal soldiers, then ambushed 116 more. On October 26th, Anderson himself was ambushed and killed, but one of his close lieutenants, Jesse James, got away.

In Tennessee Nathan Bedford Forrest's men surrounded Fort Pillow, held by a unit of Tennessee Unionists and black troops, and demanded its surrender. When the Union commander refused, the fort was overrun. As many as 300 soldiers, most of them black, were killed, many after they surrendered.

"It is hoped that these facts will demonstrate to the Northern people that negro soldiers cannot cope with Southerners".
(Nathan Bedford Forrest).

"I said, don't shoot me, and one of them said, go out and hold my horse. I made a step or two, and he said, turn around. I will hold my horse and shoot you, too. I no sooner turned around than he shot me in the face. I fell down as if I was dead. He shot me again and hit my arm, not my head. I laid there until I could hear him no more, and then I started back. I got back about sunup and wandered about until a gunboat came along, and I came up on that with about 10 others".
(Private George Shaw, African American Unionist soldier, company B, 6th U.S. Heavy Artillery).

In retaliation for Fort Pillow, Grant ended the system under which prisoners had always been exchanged until the South agreed to recognize "No distinction whatever between white and colored prisoners". Davis and Lee refused.

North and south, prisons soon bulged with unexchanged prisoners. Already inadequate prison camps became nightmares.

The worst was the Confederate prison near Andersonville, Georgia. Meant to hold a maximum of 10,000 Northern prisoners, by august 1864, it had 33,000, the fifth largest city in the Confederacy.

Its commandant, a German - Swiss immigrant named Henry Wirz, forbade prisoners to build shelters. Most lived in holes scratched in the ground covered by a blanket. The daily ration was a teaspoon of salt, 3 tablespoons of beans, and half a pint of cornmeal. A foul creek called sweet water branch served as both drinking water and sewer.

"One third of the original enclosure was swampy, a mud of liquid filth, voidings from the thousands, seething with maggots in full activity. Death at the hand of the guards, though murder in cold blood, was merciful beside the systematic, studied, absolute murder inside by slow death".

In one year, 13,000 men died at Andersonville and were buried in mass graves.

"Can those be men? Are they not really corpses? They lay there, most of them, quite still, but with a horrible look in their eyes. The dead there are not to be pitied as much as some of the living that have come from there…if they can be called living".
(Walt Whitman).

"When I was taken prisoner, I weighed 165 pounds, and when I came out, I weighed 96 pounds and was considered stout compared with some I saw".

"My heart aches for these poor wretches, Yankees though they are, and I am afraid God will suffer some terrible retribution to fall upon us for letting such things happen. If the Yankees should ever come to southwest Georgia and go to Anderson and see the graves there, God have mercy on the land!".....
(Eliza Frances Andrews)

At Milledgeville, Georgia, Sherman's men boiled their coffee over bonfires of Confederate currency, held a mock session of the legislature that passed a resolution returning Georgia to the union. Sherman's men were feasting on delicacies foraged from local farms when a band of emaciated men tottered into the firelight. They were Union escapees from Andersonville prison.

An Indiana colonel remembered that the sight of the starved men "sickened and infuriated" his troops. "When foraging now, they think of the tens of thousands of their imprisoned comrades slowly perishing with hunger, and they sweep with the scythe of destruction".

Ken Burns', "The Civil War", 1990.

Most atrocities, committed during the American Civil War were committed not by combatants on the battlefield, where a certain degree of "chivalry" still existed, but rather by little more than roving lynch mobs, who operated behind the lines inside each other's territory. Acting virtually independently, in particular in Kansas even well before the Civil War had started, these gangs carried out sickening guerrilla tactics against the enemy. One of the most feared of all was the Confederate Bill Anderson who was responsible for the deaths of over 100 Union soldiers, and who carried scalps of those he had killed. At Fort Pillow Nathan Bedford Forrest's ungoverned rage was particularly directed against black troops. In disgust Ulysses S. Grant ended the system under which prisoners had always been exchanged until the South agreed to recognize "No distinction whatever between white and colored prisoners". But Jefferson Davis refused. This led to a catastrophic rise in the number of prisoners of war which both sides had to accommodate. The North had the capacity to handle this, the South did not.

The biggest prisoner of war camp in the South was at Andersonville, where the absolute capacity was 10,000, but by the end of the war, it held well over 30,000. The South could barely provide for its own army, let alone tens of thousands of Union prisoners. Andersonville became a camp whose conditions would rival if not quite in scale, then at least in horrific nature, those of the Nazis in the following century. In one year over 13,000 died of starvation and disease and were buried in mass graves. But indiscriminate killings also added to the fearful toll. A boundary fence known as "the dead line"

demarcated a no-man's land that kept prisoners in. Anyone crossing or even accidently touching the line was shot without warning by sentries placed in pigeon roosts.

A chilling eye witness description of Andersonville, was left by Robert H. Kellogg, a sergeant major in the 16th Regiment Connecticut Volunteers. He became a prisoner to the Confederates, and was sent to Andersonville on May 2, 1864.

"...As we entered the place, a spectacle met our eyes that almost froze our blood with horror, and made our hearts fail within us. Before us were forms that had once been active and erect - stalwart men, now nothing but mere walking skeletons, covered with filth and vermin. Many of our men, in the heat and intensity of their feeling, exclaimed with earnestness. "Can this be hell?" "God protect us!" and all thought that he alone could bring them out alive from so terrible a place. In the center of the whole was a swamp, occupying about three or four acres of the narrowed limits, and a part of this marshy place had been used by the prisoners as a sink, and excrement covered the ground, the scent arising from which was suffocating. The ground allotted to our ninety was near the edge of this plague-spot, and how we were to live through the warm summer weather in the midst of such fearful surroundings, was more than we cared to think of just then…"

Starvation was not the only cause of death at the Andersonville Prison camp. In an age totally ignorant of the nature of infectious disease, typhoid, typhus, pneumonia and above all, dysentery, took a fearful toll.

In one year, 13,000 Union soldiers died at Andersonville prison camp alone, and were buried in mass graves. (Andersonville National War Cemetery, Georgia).

SHIGELLOSIS

Shigella, (electron micrograph, CDC)

Introduction

Shigellosis is one of the causes of **bacterial dysentery**.

It is extremely contagious largely because the infectious inoculum is extremely low, (possibly as low as just 10 organisms!).

Important aspects of this disease include:

- **Its relevance to food handlers in relation to public health.**
- **Its potential for severe disease**
- **Its potential for epidemics**
- **Its recent and alarming increase in antibiotic resistance in many strains**

Antibiotics may shorten the duration and severity of illness. Their use should be based on:

- **The serotype**
- **Severity of illness**
- **Host characteristics**.

See also separate document on:

- **Food and Waterborne Infections (in Infectious Diseases folder).**

History

The shigella genus is named for the Japanese bacteriologist and physician, **Kiyoshi Shiga** (1871 - 1957) who discovered Shigella dysenteriae, the bacillus that caused a massive dysentery epidemic in 1897 in Japan, during which more than 90,000 cases were reported, with a mortality rate that approached 30%

Epidemiology

Shigella infection occurs worldwide.

The incidence of *specific serotypes* varies by country.

Sh. sonnei is the most common type reported in Victoria and Australia.

Sh. Dysenteriae and *Sh. flexneri* are usually acquired overseas. These serotypes often have multi-antibiotic resistance.

In Victoria outbreaks have occurred in child care centres and amongst men who have sex with men.

Two-thirds of cases including most of the deaths that occur worldwide are in children less than ten years of age.

The disease is rare in infants under 6 months of age because breastfeeding is protective

Pathology

Organism:

Shigella is a gram-negative, facultative anaerobic, non-spore forming, non-motile, rod-shaped bacterium.

The genus *Shigella* consists of four species:

1. Group A: *Sh. Dysenteriae*

2. Group B: *Sh. Flexneri*

3. Group C: *Sh. Boydii*

4. Group D: *Sh. Sonnei*

Groups A, B and C are further divided into approximately 40 serotypes, designated by specific numbers.

Disease severity:

The severity of infection depends on a number of factors, including:

1. Host factors:

    - Age and nutritional status.

2. The serotype involved:

    - Infection with *Sh. sonnei* usually results in short clinical courses and low case fatality rates.

    - Infection with *Sh. dysenteriae* is often associated with more serious disease and a higher case fatality rates.

Risk factors:

The risk of infection is increased in:

1. Men who have sex with men

2. People with immune deficiency disorders,

3. People attending childcare or having contact with a child in childcare

4. International travellers who do not take adequate food and water safety precautions

Transmission

Shigella is extremely contagious largely because the infectious inoculum is extremely low, (possibly as low as just 10 organisms!).

The major modes of transmission include:

1. The faecal-oral route, (this is the most common)

    - *Shigella* is easily transmitted person-to-person because the infectious dose required to produce clinical disease is very low and may be as few as ten organisms! [1]

2. Via contaminated food, water or milk

3. By flies.

4. Shigellosis can also be a sexually transmitted disease, in particular, in men who have sex with men.

    (*The term "men who have sex with men" is used in CDC surveillance systems because it indicates the behaviours that transmit Shigella infection, rather than how individuals self-identify in terms of their sexuality).*

Incubation Period

- The incubation period varies depends on the exact serotype.
- It can range from as short as 12 hours up to 7 days.
- Most commonly it lies within the range of 1-3 days.

Reservoir

- Humans.

Period of Communicability

- Shigella is communicable during the acute phase of the illness and while the organism agent is present in faeces - usually up to 4 weeks.
- Asymptomatic carriage and excretion may persist in some cases however for several months.

Susceptibility and Resistance

- Everyone is susceptible to infection, with Shigella, however the disease is rare in infants **under 6 months** of age because **breastfeeding is protective.**
- Infection can follow the ingestion of just a small number of organisms.
- In endemic regions the disease is usually more severe in **young children.**

Clinical Features

The spectrum of disease severity can range from asymptomatic to fatal.

Clinical shigellosis is characterised by an acute onset of:

1. Fever
2. Non-specific constitutional symptoms:
    - Lethargy/ malaise
    - Myalgias
    - Anorexia
3. GIT upset:
    - Nausea vomiting
    - Abdominal cramps
    - Diarrhoea:

      This may be in the form of simple watery diarrhoea, but more often it presents in the form of an acute "dysentery" type picture, with the presence of:

        - ♥ Blood
        - ♥ Mucous
        - ♥ Pus

Illness can last from several days to several weeks, but the average duration is around 4 - 7 days

Asymptomatic infection can occur and GIT carriage may persist for months.

Uncommon complications can include:

1. Toxic megacolon
2. Septicaemia
3. Reactive arthritis
4. Haemolytic uraemic syndrome, (rare)

Differential diagnosis:

The main differential diagnoses will include other causes of invasive dysenteries.

The causes of invasive dysenteries include:

1. Salmonella.
2. Shigella
3. Entamoeba histolytica
4. E. Coli, (some strains)
5. Yersinia enterocolitica
6. Campylobacter jejuni

Investigations

Blood tests:

1. FBE
2. CRP
3. U&Es/ glucose
4. Blood cultures if very unwell.

Microscopy and culture

Shigella infection is diagnosed by the isolation of the organism from clinical specimens, usually blood cultures or faecal cultures.

Culture and sensitivity studies should be done in all cases, in view of the increasing incidence of multi-resistant strains.

Management

Preventive:

Good personal hygiene is the single most important preventive measure.

Frequent and thorough hand washing is important before eating and food handling, and after toilet use, especially in young children.

Educate travellers on the need for safe food and water consumption.

There is no vaccine currently available

Treatment:

1. Supportive:

   - Supportive care, such as **IV fluid resuscitation** and **electrolyte replacement** is given, as for any dysentery.

2. Antibiotics:

   Successful treatment of shigellosis reduces the duration of illness and infectivity.

   The need for antibiotic use should be based on:

   - **The serotype / susceptibility testing:**

     ♥ The pattern of antibiotic susceptibility of Shigella strains varies from country to country, and multidrug-resistant strains are now present in many regions.

     Empiric antibiotic therapy may have to be **modified** according to the results of susceptibility testing.

   - **Severity of illness**

     ♥ **Treatment is indicated for patients with severe disease, to shorten the duration of symptoms.**

   - **Host characteristics**:

     ♥ Treatment **reduces disease transmission**, so for public health reasons treatment is usually recommended for: [5]

     ♥♥ *Children younger than 6 years*

     ♥♥ *People who are institutionalized*

     ♥♥ *Men who have sex with men*

     ♥♥ *The immunosuppressed*

     ♥♥ *Food handlers.*

     ♥♥ **Health care workers**

♥♥ Childcare workers

However, the approach may also vary between states and territories. [2]

Empiric therapy: [3]

- **IV ceftriaxone**:
  - ♥ For seriously unwell or hospitalized patients.
- **Azithromycin** is now the preferred empirical treatment, *regardless of place or method of acquisition.* [3]

  Give:
  - ♥ **500 mg (child: 10 mg/kg up to 500 mg) orally, on day 1.**

    Then:
  - ♥ **250 mg (child: 5 mg/kg up to 250 mg) orally, daily for a further 4 days.** [2]

Note that:

- The incidence of *quinolone resistance* is increasing in infection acquired in developing countries. [2]
- Trimethoprim + sulfamethoxazole, has also traditionally be used but there is now high resistance to these agents. [3]

3. Anti-motility drugs:
   - Anti-motility drugs are thought to increase the risk of prolonged carriage and so are **not** recommended.

Exclusion:

Exclude school children, until 24 hours after diarrhoea has ceased.

Food handlers should be excluded from work until two negative stools have been obtained at least 24 hours apart and not less than 48 hours after completing antibiotics. Cases in institutions should be separated from non-infected residents, if possible.

The diagnosis should be considered in symptomatic contacts. However, stool cultures may be confined to food handlers and those in situations where the spread of infection is particularly likely (childcare centers, hospitals, institutions).

Symptomatic contacts of shigellosis cases should be excluded from food handling and the care of children or patients until investigated.

Notification

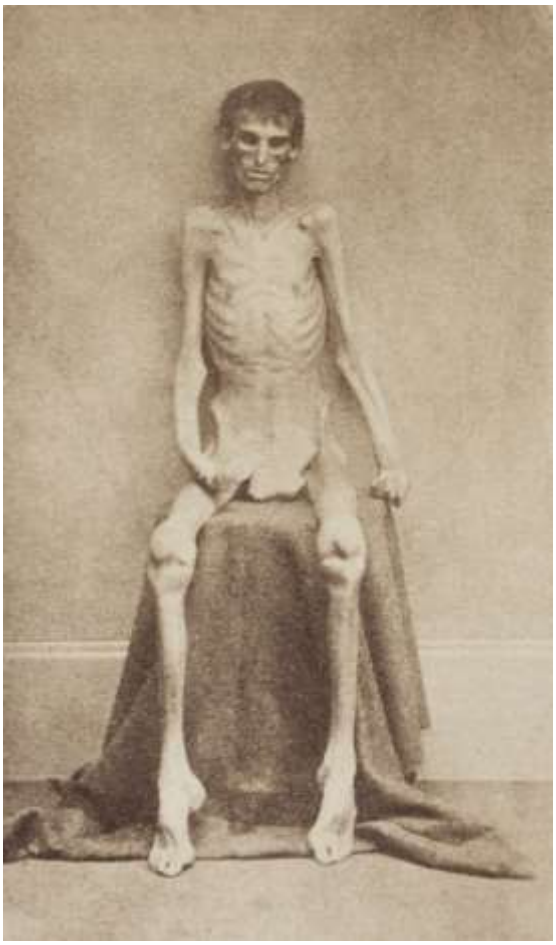
Shigellosis is a Group B disease and so must be notified in writing within five days of diagnosis.

This is a Victorian statutory requirement.

Two or more related cases should be considered indicative of an **outbreak** and requiring investigation.

William T. Anderson (1840-1864)

Jesse James (1847 - 1882)



"Can those be men? Are they not really corpses? They lay there, most of them, quite still, but with a horrible look in their eyes. The dead there are not to be pitied as much as some of the living that have come from there…if they can be called living". (Walt Whitman).

Left: Union prisoner found at Andersonville. This man (reportedly) survived ...though for how long is unknown. Right: Burial detail Andersonville.

Left: Kiyoshi Shiga, 1924. Right: "Follow the mentor's spirit, not the mentor's footsteps"; calligraphy by Dr. Kiyoshi Shiga.

"The discovery of the dysentery bacillus stirred my young heart with hopes of eradicating the disease. Many thousands still suffer from this disease every year, and the light of hope that once burned so brightly has faded as a dream of a summer night. This sacred fire must not burn out, ...as Louis Pasteur urged, you must persevere until the time comes when you have contributed in some way to the progress and good of humanity...

Kiyoshi Shiga, address to tercentenary celebration guests at Harvard University,1936.

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