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A CASE STUDY ON BRUCELLOSIS

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ABSTRACT

Brucellosis is a gram negative cocci bacterial infection caused by various strains of brucella, it may affect any one part of the body or affect the multiple part of the body. This is a case report of Brucellosis of which 60year male patient was admitted in hospital with illness of back pain and fever with chills. His past medical history was found to be Hypertension since 20years. Past medication history was observed to be Amlodipine 5mg OD. Social history convey that he is a alcoholic and smoker since 40 years and left since 20 years, and actually he is a Goat keeper. On physical examination his BP is 160/90mm of Hg and pulse rate is 66 beats per minute. On systemic examination diagnosis was done with CBC, LFT, Brucella Ab test, MRI of the lumbar spine and radiography of thoracic spine was showing abnormal diagnosis which conclude the Brucellosis. Treatment started by giving antibiotic such as capsule Doxycyline, inj Pantoprazole, syrup Sucrlafate for underlying Peptic ulcer disease, Amlodipine and Telmisaratn for hypertension, Tab ATT for pott's spine, and tramadol and diclofenac to treat the symptoms such as back pain. After continuing the same medication for 4 more days the patients symptoms of fever and back pain was relieved. but the infection may be completely cured after soo many days soo they given discharge medication to treat the disease and patient was discharged.

KEYWORDS: Brucellosis, gram negative cocci, Hypertension, Goat keeper, Peptic ulcer disease and Pott's spine.

INTRODUCTION

BRUCELLOSIS (lat. Brucellosis or Abortus epizooticus):- Human brucellosis is considered as a life threatening debilitating disease characterized by weakness, fever, malaise, arthritis,

osteomyelitis, endocarditis, or meningoencephalitis. In domestic animals, the disease occurs as a chronic infection that results in placentitis and abortion in pregnant females or orchitis and epididymitis in males.[1]

The disease is caused by small aerobic, Gram negative rods of the genus brucella. This disease is also called as Maltese fever, Bang's disease, undulant fever, or Mediterranean fever (because, the countries of Mediterranean are at high risk of developing Brucellosis.[3]

EPIDEMIOLOGY

The first case was reported in the united states in 1898 by Musser and Sailer, and reported cases reached a maximum of 6, 321 in 1947.[2] In India, about 80% of people live within close contact to domestic livestock animals or wildlife, a critical risk factor zoonotic disease transmission such as brucellosis; yet true incidence of human brucellosis is unknown.the centres for disease control an prevention CDC reported approximately 100 cases each year during past 10 years, with most cases in the southwest region.

Seroprevalence studies suggest infection may range between 0.9% - 18.1%, with higher risk in veterinarians and farm attenders.[5] Progress report of monitoring programs from 2012-2013 by the Indian council of agriculture research estimate that current national seroprevalence of brucellosis in cattle is roughly 13.5% and at a stable, endemic equilibrium.[5] Senthil et al conducted a seroprevalence study of bovine brucellosis in Chennai, India utilizing various diagnostic tests with positive results ranging from 3.3% - 11.4%. Isloor et al found overall prevalence was 1.9% in cattle and 1.8% in buffalo.[5]

ETIOLOGY: Divisions of the genus into six classical species Brucella, namely B. Melitensis, B.abortus, B. Suis, B.canis, B.ovis, and B. Neotomae, is still used due to clinical and historical reasons.[1]

Table 1: Zoonitic Potential and Host Preference of Brucella.

Species	Zoonotic potential	Host preference
Brucella melitensis	High	Sheep, goat
Brucella aborthus	Moderate	Cattle
Brucella suis	Moderate	Pig
Brucella canis	Mild	Dog
Brucella ovis	Absent	Sheep
Brucella neotomae	Absent	Desert wood rat
Brucella ceti	Mild	Cetaceans
Brucella pennipedialis	Mild	Seals
Brucella microti	Absent	Common voles

The genus brucella was discovered by David Bruce in 1887 and currently consists of 10 species these are

1) **Brucella melitensis** :- isolated in 1887 in Malta (hence called Malta fever) by David Bruce from the spleen of a soldier who died from acute Brucellosis.
2) **Brucella abortus** :- these species causing abortions in cattle, for many years the main etiologic factor of brucellosis in animals and humans (Bang's disease) in Poland.
3) **Brucella suis** :- causing the disease in mainly in swine, pathogenic also for humans.
4) **Brucella canis** :- isolated from dogs, may also be the cause of illness in humans.
5) **Brucella neotomae** :- isolated from rats in the united states.
6) **Brucella ovis** :- infects not only sheep, in Poland it was cultured from ram semen.
7) **Brucella marina**–brucellsceti found in sea mammals in Atlantc Ocean.
8) **Brucella marina** – brucella pinnipedialis :- they found in sea mammals.
9) **Brucella microti** :- isolated from the common vole in the Czech republic, from soil in the same area years later, and from mandibular lymph nodes of wild red foxes in Austria.
10) **Brucella inopinata** :- isolated from the breast implant wound of a woman with clinical signs of brucellosis.[3]

Clinical manifestation[3]

- **Acute brucellosis:-** which is characterized by : weakness, undulant fever, headaches, pain involving muscles and joints (60% of cases – pain in the lumbar region of the spine), hot flushes, testicular pain in men, fine red rash (upto 5% cases), symptoms on the parts of the gastrointestinal tract:- stomach ache, diarrhoea, nausea, vomiting, constipation, lack of appetite; the acute phase may end inn death, curing, transition into a sub –acute or chronic form;
- **Sub acute brucellosis:-**in which there occur all or the majority of the symptoms typical of the acute course however, more weakly expressed.
- **Chronic brucellosis:-** a) primary, b) secondary
  Chronic brucellosis may be both
  - Seropositive, and
  - Seronegative (detected by burnet's reaction, PCR,)

- **Subclinical and asymptomatic brucellosis**
- **Some researchers have also introduced the terms metabrucellosis and brucellosis allergy'.**

RISK FACTORS

Brucellosis is found globally and is a reportable disease in most countries. It affects people of all ages and both sexes. In the general population, most cases are caused by the consumption of raw milk or its derivatives such as fresh cheese. Most of these cases are from sheep and goat products.[6]

Table:-02.

Countries at Risk	Although brucellosis can be found worldwide, it is more common in countries that do not have effective public health and domestic animal health programs. Areas currently listed as high risk are: • Mediterranean Basin (Portugal, Spain, Southern France, Italy, Greece, Turkey, North Africa) • Mexico, South America and Central America • Eastern Europe • Asia • Africa • The Caribbean • The Middle East
Occupational Risks	Individuals in certain occupations or settings may face increased exposure to the bacteria that cause Brucellosis. These include: • **Slaughterhouse workers** o Contamination of skin wounds may be a problem for individuals working in slaughterhouses • **Meat-packing employees** o Contamination of skin wounds may be a problem for individuals working in meat packing plants • **Veterinarians** o Contamination of skin wounds may be a problem for veterinarians o *B.canis* is the species of *Brucella* species that can infect dogs. This species has occasionally been transmitted to humans but the vast majority of dog infections do not result in human illness. Although veterinarians exposed to blood of infected animals are at risk, pet owners are not considered to be at risk for infection. This is partly because it is unlikely that they will come in contact with blood, semen or placenta of the dog. • **Laboratory workers** o Inhalation of *Brucella* organisms is not a common route of infection but it can be a significant hazard for people working in laboratories
Unpasteurized Dairy Products and raw meat products	• Unpasteurized cheeses (sometimes called “village cheeses”) from areas at increased risk for brucellosis may represent a particular risk for tourists. • Developing countries often do not have safeguards that can help prevent or monitor possible outbreaks, such as pasteurization laws, animal control/slaughter regulations and brucellosis surveillance programs. • When traveling in areas with high risk, individuals may unknowingly consume unpasteurized dairy products. People from the U.S. who travel to these areas should: o Recognize that milk and dairy products may not be pasteurized and could be unsafe to consume. o Only consume meat products which are thoroughly cooked, since many countries cannot ensure Brucellosis-free meat products.

Hunters	• Some game animals that transmit brucellosis include: ○ Wild hogs (feral swine) ○ Elk ○ Bison ○ Caribou ○ Moose • Hunters may be infected through skin wounds or by accidentally ingesting the bacteria after cleaning animals that they have killed.
Risks for Expecting Mothers	• While rare, human-to-human transmission from lactating mothers to their breastfed infants has been reported. • Prompt diagnosis and treatment of brucellosis during pregnancy can be lifesaving for the fetus.[7]

PATHOGENESIS OF BRUCELLOSIS

Brucelle display strong tissue tropism and replicate within vacoulces of macrophages, dendritic cells, and placental trophoblasts.[4] The ability of Brucella spp. to cause disease requires a few critical steps during infection. Brucella spp. can invade epithelial cells of the host, allowing infection through mucosal surfaces: M cells in the intestine have been identified as a portal of entry for Brucella spp. Once Brucella spp. have invaded, usually through the digestive or respiratory tract, they are capable of surviving intracellularly within phagocytic or non-phagocytic host cells. Brucella has the ability to interfere with intracellular trafficking, preventing fusion of the Brucella-containing vacuole (BCV) with lysosome markers, and directing the vacuole towards a compartment that has rough endoplasmic reticulum (RER), which is highly permissive to intracellular replication of Brucella.[9]

Diagnosis[10]

Table:-03

DIRECT DIAGNOSIS TEST	INDIRECT DIAGNOSIS TEST
STAINING	SLOW AGGLUTINATION TEST
CULTURE	BUFFERED BRECELLA ANTIGEN TEST
BIOTYPING	COMPLMENT FIXATION TEST
MOLECULAR METHODS	ELISA TEST
IDENTIFICATION	FLUORESCENCE POLARIZATION ASSAY
MOLECULAR TYPING	MILK TEST
	SKIN TEST

COMPLICATIONS[8]

Brucellosis can effect any part of your body such as heart, central nervous system, reproductive system, and liver. chronic brucellosis may cause complication in just one organ or throughtout the body.

- Inflammation of the inner lining of the heart chambers[endocarditis].

- Arthritis.
- Epididymo-orchitis[inflammation and infection of the testicles].
- Inflammation and infection of the spleen and liver.
- Central nervous system infections.

MANAGEMENT OF BRUCELLOSIS

- **NON PHARMACOLOGICAL TREATMENT[8]**

✓ Avoid unpasteurised dairy products
✓ Cook meat thoroughly
✓ Wear gloves
✓ Take safety precautions in high risk work place
✓ Vaccinate domestic animals.

PHARMACOLOGICAL TREATMENT[2]

Table:-04

STAGE OF LIFE	TREATMENT OPTION 1	TREATMENT OPTION 2	TREATMENT OPTION 3
Pregnancy	Rifampicin 900 mg po qd for 6 wk		
< 8 years	Trimethoprim-sulfamethoxazole (TMP-SMX) 5 mg/kg of TMP q12 h po for 45 d +gentamicin 2 mg/kg iv or im for 7 d	TMP/SMX 5 mg/kg of TMP q12 h po for 45 d + rifampicin 10 mg/kg/d po qd for 45 d	
≥8 years and adults	Doxycycline 100 mg po bid for 6 wk + rifampicin 600–900 mg/d po for 6 wk	Gentamicin 2 mg/kg q 8h iv or im for 7 d + rifampicin 600–900 mg/po /qd for 6 wk	Ciprofloxacin 1 g po qd for 30 d+ rifampicin 600 mg/ po/qd for 30 days (adults only)

CASE REPORT

A 60 year old male patient was admitted in vijayanagara institute of medical science, Ballari[Karnataka] with a chief complaints of back pain since one month, and fever with chills since 20 days.

His social history conveys that he is an alcoholic and smoker from past 40 years and left since 20years.

His past medical history convey that he is a known case of hypertension since 20 years on regular medication (Amlodipine 5mg OD)

His personal history conveys that reduced appetite, and reduced sleep.

On examination his BP was found to be 160/90mm of hg, pulse rate was found to be 66bpm.

On systemic examination all were found to be normal on clinical examination tenderness was positive in dorsal spine region, no swelling, local rise of temperature., He weighed 65kg.

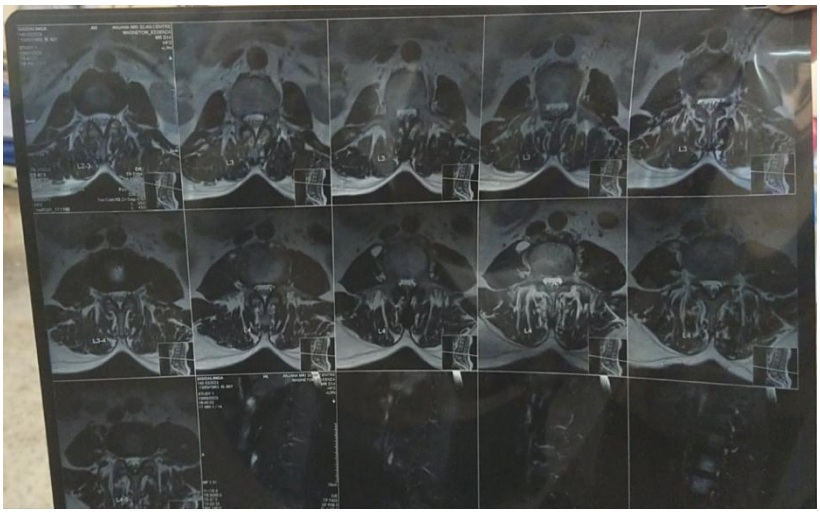
ADMISSION LABORTARY RESULTS

Table :- 05.

Haematology	**Hb:- 11.1mg/dl (reduced)** **Lymphocytes :- 18% (reduced)** **ESR :- 94mm/hr (increased)**
Electrolytes	**Calcium :- 4.36mEq/L (reduced)**
Liver function test	**AST :- 57U/L (increased)** **ALT :- 51U/L (increased)** **Direct bilirubin :- 0.7 (increased)**
Dengue ab test	**IgG and IgM positive**
Brucella ab test	**Positive**
Radiographs of thoracic spine in AP and lateral view	**Degenerative changes in spine**
MRI lumbar spine screening of entire spine	***Altered signal in L3 L4 vertebral bodiestheir end plates and intervening disc** ***Small collections seen in right PSOAS at level of L4** ***osteophytes seen at C7 level**
Sonography study of back of thorax	**Very minimal left PE in posterior costophrenic**

In case of spinal brucellosis which shows abnormal in MRI scanning which are given in detail in above section and following images shows confirmation

Disc bulge seen at L5-S1 indenting anterior thecal sac and lysis @L5.



Altered signal seen in L3, L4 vertebral bodies, their end plates and intervening disc.

TREATMENT

On confirmation, physician started the treatment by giving antibiotic such as capsule Doxycycline 100mg OD for 6 days, Tablet Pyridoxine hydrochloride given as a supplement 40mg (0-0-1/2) for 10 days, Inj Diclofenac 1cc given in order to treat back pain IM (sos) along with injection tramadol 75ml in 100ml NS for 10 days, Inj Pantoprazole 40mg OD and syrup Sucralfate is given for 10 days in order to treat peptic ulcer disease (PUD), in order to treat insomnia caused by PUD Tab Clonazepam 0.25mg (1/2-1/2-1) for 10 days, Tab Amlodipine 5mg BD is given to treat hypertension for 10 days, Tab Calcium + Vitamin D 500mg OD supplement is given for 10 days due to reduced calcium levels, Tab Telmisartan 40mg OD given on day 6 because on day 6 his BP was 170/100 mm of hg and Anti-tubercular therapy of four drug combination for 10 days to treat Pott's Spine, these are the hospital course.

DISCHARGE ON MEDICATION

Name of the medications	Dose	Route	Frequency	Days
Cap Doxycycline	100mg	PO	1-0-1	For 4weeks
ATT		PO	4-0-0	For 6months
Tab Pyridoxine	10mg	PO	0-0-1	For 10days
Tab Pantoprazole	40	PO	1-0-0	5days
Syrup Sucralfate	10ml	PO	1-0-1	10days
Tab Amlodipine	5mg	PO	1-0-0	Continued
Tab Telmisartan	40mg	PO	1-0-0	Continued

DISCUSSION

Human brucellosis is considered as a life-threatening debilitating disease, for which hospital admission is necessary as the patient has to be regularly monitored by the physicians. The most common cause of brucellosis is Brucella melitensis, host preference for this organism is sheep and goat, and the zoonotic potential is high, incubation period of disease can be highly variable, ranging from 1 week to 2months, but usually 2-4weeks, where as in this case the patient was admitted with a complaints of back pain and fever with chills, and he is a known case of hypertension and his daily work is Goatherder(goat keeper). So the physician is adviced to take a report of CBC, LFT, ELECTROLYTES, DENGUE Ab test, Brucella Ab test, sonography study of back of thorax, radiographs of thoracic spine in AP and Lateral View, MRI – lumbar spine screening of entire spine. These all parameters are showing a abnormal impression as shown in admission laboratory results and which confirms the presence of BRUCELLOSIS along with this he is suffering from Pott's spine and PUD. Brucellosis is a bacterial infection so antibiotics are given to treat infection and to treat back pain analgesics are prescribed and along with this treatment ATT and Proton pump inhibitors are given to treat pott's spine and PUD respectively, the 1st criteria to confirm brucellosis is isolation brucella taking blood sample which is given a positive result, and presence of antibodies like IgG and IgM confirms the presence of infection and when come to biochemical assay there is a increase in hepatic enzymes due to presence of infection in liver and lymphocytes are also decreased and presence of anaemic condition, increase in ESR level along with these details the involvement lumbar spine and presence of osteophytes confirms the BRUCELLOSIS, because osteophytes are not seen in case of Spinal TB and in Spinal there is involvement of dorsal lumbar, so we conclude this disease as a BRUCELLOSIS.

CONCLUSION

physicians followed the guidelines for the treatment, but along with capsule Doxycycline prescribing the Rifampicin can helps to recover the patient earlier but due to many complication in patient along with Brucellosis they prescribed the Doxycycline alone along with this medicine, many medicine are given to treat the underlying disease. Prevention of brucellosis is based on surveillance and prevention of risk factors. The most effective prevention strategy is elimination of infection in animals. Vaccination of cattle, goat, and sheep is recommended in enzootic areas with high prevalence.

Prevention of human infection is primarily based on raising awareness, food safety measures, occupational hygiene and laboratory safety.

Education campaigns about avoiding unpasteurized milk products can be effective, as well as policies on its sale.

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