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ONE HEALTH

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Editors

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The Case for One Health Implementation Secure in January 2017

Submitted February 1, 2017 by Bruce Kaplan, DVM, Contents Manager/Editor

One Health Initiative Website, Co-Founder One Health Initiative team/website,http://goo.gl/KujQkP

In short, the practicable argument(s) for implementing the One Health approach internationally are essentially summed up by two recent One Health Initiative website NEWS items, i.e. seehttp://www.onehealthinitiative.com/news.php?query=A+COGENT+CASE+FOR+%91ONE+HEALTH%92+IMPLEMENTATION...NOW+January+2017%21+ and http://www.onehealthinitiative.com/news.php?query=Reminder+January+to+December+2016%3A+%937+Prominent+U.S.+and+international+individual+and+organizational+One+Health+Endorsements+%28multidisciplinary%29%94+.

The contents of this One Health Newsletter (past and present) is a further testament to the critical need for the brilliant One Health concept's co-equal interdisciplinary / multidisciplinary / transdisciplinary methodology-viz. "... the collaborative efforts of multiple disciplines working locally, nationally, and globally to attain optimal health for people, animals, plants and our environment" in order to more expeditiously and efficaciously "... help to protect and/or save untold millions of lives in our generation and for those to come."

Paragonimiasis

One of the infections that mimic tuberculosis (TB) is paragonimiasis (PRG), a foodborne parasitic disease caused by lung flukes of the genus Paragonimus. In the northeastern states of India, TB and PRG are endemic; however, PRG is rarely included in the differential diagnosis of TB. Both diseases are similar in clinical presentation including chronic cough, dyspnoea, haemoptysis and chest pain; however, the mode of transmission is different. TB is an airborne infection, and PRG is a food-borne trematode infection, usually caused after consumption of raw, pickled or insufficiently cooked freshwater crustaceans (crabs and crayfish) containing encysted metacercariae of the parasite. PRG is considered a rare and rather unusual condition of limited public health importance, and thus, it is widely neglected. The microscopic examination for PRG is cumbersome and has low sensitivity, making the PRG diagnosis extremely challenging in resource-limited countries. In the northeastern states of India, both TB and PRG have been present, and several endemic foci have been discovered (3, 4, 6). The prevalence of PRG ranged from 7 to 15% (3, 4) in the general population and around 50% in TB patients; however, PRG is often underdiagnosed.

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Trichinella infection was recorded in wild boar and leopard for the first time in India (www.ivri.nic.in/division/sections/wildlife/MajorAchievements. aspx)

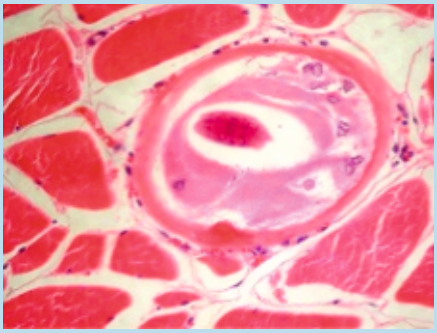
Editors

Dr. Raj Kumar Singh, M.V.Sc. & A.H., M.V.Sc, Ph.D, FNAAS, FIVS, FICN, FIAVMI, FISVIB, FAEB, FSII, FNAVS, FSPR, FASc(AW), ASc (AW), is an eminent virologist currently Director of ICAR-Indian Veterinary Research Institute, Izatnagar. Dr. Singh is a noted scientist and academician of high repute in the field of Veterinary Sciences with specialization in Veterinary Microbiology, Biotechnology, Molecular Epidemiology, Diagnostics, Vaccinology and Equine Science. Dr. Singh developed animal vaccines, diagnostic tests and kits including live attenuated vaccines namely (thermo-adapted TCRP, goatpox, sheeppox, camelpox, orf, thermo-adapted PPR (sheep isolate) for sheep, thermo-adapted PPR (goat isolate) for goat, Highly Attenuated goatpox (HAGP), PPR+Goatpox double combination, tsPPR + HAGP double combination, PPR+Goatpox+Orf for goats, PPR+sheeppox+Orf for sheep, deuterated PPR (Sungri); and a few vaccine candidates; rapid and reliable diagnostics (PCRs for Mycobacterium bovis and M. tuberculosis differentiation, buffalopox virus, camelpox virus, sheeppox virus, goatpox virus, orf virus; RT-PCRs for Rabies, Bluetongue(BT), PPR, equine influenza; qPCRs for camelpox, buffalopox, goatpox and PPR;recombinant protein antigen-based Diagnostic ELISAs for BT, PPR, Capripox, B. mallei, equine influenza; monoclonal antibody-based ELISAs like sELISA and cELISA for BT, etc. His credentials are available on www.ivri.nic.in

Deadly worm Trichinosis found in wild boar, leopard carcasses can infect humans

Priyangi Agarwal | TNN | Updated: Jun 2, 2016, 10.42 PM IST

BAREILLY: The detection of Trichinosis, a type of worm, in the carcass of a wild boar killed in January in Pilibhit and a leopard killed in Bahraich last month has alarmed scientists at Indian Veterinary Research Institute (IVRI) here. Scientists warned that some 200 species of animals can be infected with this parasite and it was transmissible from animals to humans. Every year, nearly 2,500 people die after getting infected with this parasite across the world but very few cases have been reported in India till now. The parasite can enter a human body from semi or under-cooked meat. A person can fall ill within two to three weeks. "The symptoms are fever, muscle soreness and pain, gastrointestinal symptoms, respiratory distress, vomiting, diarrhoea and rashes," said Hira Ram, senior scientist at parasitology division, IVRI. Scientists said when an animal dies, the other forms of parasites in its body also die within a short period. "However, the Trichinosis parasites remain alive for a few months even after the death of the animal. Hence, people should eat meat which is cooked at 60 degree Centigrade for 15 minutes or properly cooked in a pressure cooker," said Ram. In northern India, 76 people in Uttarakhand's Pauri Garhwal district were taken ill in April 2011 after they ate wild boar meat infected with this



Trichinella sp larvae in the muscle skeletal muscle fibers

parasite. Of these, 12 died in four months.

"After this incident, National Centre for Disease Control asked IVRI to help create awareness among people. When Raj Kumar Singh joined IVRI as director in February 2014, he emphasised on the need to take up the project on Trichinosis parasite. We have now found it in the boar and leopard," said PS Banerjee, principal scientist and head of parasitology division, IVRI.

"In India, the presence of this parasite has been found in a domestic pig in Mumbai and a cat and civet cat in Kolkata in the past. The low number of cases may be because of lack of proper diagnosis," said Banerjee. Scientists have decided to conduct a study on other species which may be infected. Villagers and animals on the fringes of forests may be infected with this parasite, said scientists. They will also work on developing a test to easily diagnose the presence of this parasite in humans.

Deadly parasite that killed 12 people in Pauri 2011 found in big cats

Priyangi Agarwal | TNN | Nov 4, 2016, 10.54 PM IST

BAREILLY: Scientists at Indian Veterinary Research Institute (IVRI) are alarmed after they recently found presence of trichinosis, a parasitic disease caused by roundworms of the trichinella type, in leopards, tigers and even domestic pigs. They say the deadly parasite which infects over 10,000 humans globally every year could have infected more species in the country, but it goes undetected for lack of diagnosis. Though the parasite doesn't harm animals, humans who consume uncooked or semi-cooked meat of the infected animals may die. Seventy-six people were found to be infected with trichinosis in Pauri Garhwal district of Uttarakhand, of which 12 died later.

One Health approach towards zoonotic diseases in Wardha district: a collaborative study by MGIMS Sevagram and NVC Nagpur

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Episodes of zoonotic diseases have increased globally due to several factors like growing human population, rapid urbanization, changing farming systems, closer integration between livestock and wildlife, forest encroachment and other changes in ecosystems. Most are neglected by human and animal health sectors and may achieve endemic nature. Some of the neglected zoonotic diseases in Wardha district in central India include but not limited to brucellosis, tuberculosis, leptospirosis, scrub typhus, JE and Chandipura Virus encephalitis, and pose a substantial burden on human/animal health and livelihood. During last two years we have tried to estimate the magnitude of these diseases in patients from Wardha and neighbouring districts. This study is being undertaken by three institutes- Nagpur Veterinary College (funded by ICAR), Mahatma Gandhi Institute of Medical Sciences, Sevagram and Central India Institute of Medical Sciences, Nagpur (both funded by ICMR).

In MGIMS, diagnosis is established by Bacterial culture for routine organisms including listeria; by Serology including ELISA, IIF for Orientai tsutsugamushi and MAT for Leptospira; and Molecular diagnosis using nested PCR. Mycobacterial culture is performed by solid as well liquid media. In the first year, a total of 1725 patients with acute undifferentiated fever were recruited from our tertiary care hospital and the positivity for various diseases was - Scrub Typhus 18%, Leptospirosis 12% and Brucellosis 6%. There was no case of listeriosis or bovine TB. In the second year, patients have been recruited from 7 villages with 10,000 population by house to house survey in one taluka and from a rural hospital in another. In the second year also, positivity for three diseases was observed; however, the bovine TB positivity was still absent. During the last two years there were no outbreaks of JE or Chandipura virus encephalitis and only sporadic cases were found in 8 districts of Vidarbha. The animal samples from the included villages are being collected and processed by Nagpur Veterinary College.

This study is a good example of collaboration between human and animal health care providers and a step towards achieving One Health.

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Tuberculosis-resistant cows developed in China

In a first, Chinese scientists have used a novel version of the CRISPR gene-editing technology to successfully produce live cows with increased resistance to bovine tuberculosis (TB).

The researchers from Northwest A&F University in China used a modified version of the CRISPR system called CRISPR/Cas9n to insert a new TB resistance gene — NRAMP1 — into the genome of bovine foetal fibroblasts — a cell derived from female dairy cows.

"We used a novel version of the CRISPR system to successfully insert a TB resistance gene into the cow genome. We were then able to successfully develop live cows carrying increased resistance to TB," said lead author Yong Zhang.

These cells were then used as donor cells in a process called somatic cell nuclear transfer, where the nucleus of a donor cell carrying the new gene is inserted into an egg cell, known as an ovum, from a female cow.

These ovum were then nurtured in the lab into embryos before being transferred into mother cows for a normal pregnancy cycle, in which cows were produced with no off-target effects on the animals' genetics — a common problem when creating transgenic animals using CRISPR.

"Importantly, our method produced no off target effects on the cow genetics meaning the CRISPR technology we employed may be better suited to producing transgenic livestock with purposefully manipulated genetics," Zhang added.

in the study published in the journal *Genome Biology*.

For the study, the team used CRISPR to insert the new gene in 11 calves.

The results revealed that NRAMP1 had successfully integrated into the genetic code at the targeted region in all of the calves.

When exposed to Mycobacterium bovis (M. bovis) — the bacterium that causes bovine TB — the transgenic animals showed an increased resistance to the bacteria measured by standard markers of infection in a blood sample.

Further, white blood cells taken from the calves also showed much resistance to M. bovis exposure in laboratory tests.

IANS

Pompe Disease: Timely Diagnosis Vital for successful therapy

Pompe disease is a rare multisystem genetic disorder characterized by absence or deficiency of the lysosomal enzyme alpha-glucosidase (GAA). This enzyme is required to breakdown (metabolize) the complex carbohydrate glycogen and convert it into the simple sugar glucose. Experts say that knowledge in the public domain and amongst doctors about fatal pompe disease and its treatment is limited.

Dr. Ratna Puri, Genetics Specialist, Sir Gangaram Hospital, says "it is very important to have a high index of suspicion to diagnose the patient. This suspicion is lacking in our medical community."Speaking to DTMT Dr. Puri, said "Pompe is a treatable disorder and early diagnosis is very important for the therapy to work well. However, without treatment, patients can die because of cardiac or respiratory failure."She added that with timely treatment, respiratory function stabilizes.Dr. Puri has been treating many Pompe cases in Delhi, amongst whom Meryl Sarah Mamen is one of the oldest patients.

27 year old Meryl was first diagnosed with the disease in 2005 and since then has been under care of Dr. Puri. Meryl's condition since her treatment has improved and she has successfully completed her education.

Meryl said "Due to lack of proper information, I was misdiagnosed with a dysfunction of muscles called limb-girdle muscular dystrophy (LGMD) many years ago. Therefore, I have suffered the effects of wrong treatment. Understanding the symptom and seeking immediate help is pivotal in case of Pompe disease".

Due to a lack of awareness even among doctors, the cases are not detected. This leads to either a misdiagnosis or delays in the diagnosis as well as treatment of the patient and makes their situation worse as time goes by.

India currently has about 300 patients who have been diagnosed with treatable LSDs. Due to the high cost of therapy for LSDs, such patients are denied their right to lead a normal, healthy and productive life.

NIH Begins Study to Evaluate Health Risk by Zika Virus

The National Institute of Health (NIH) and Fundacao Oswaldo Cruz Fiocruz (Fiocruz), a national scientific research organization linked to the Brazilian ministry of Health, have begun a multi-country study to evaluate the magnitude of health risks that Zika virus infection poses to pregnant women and their developing fetuses and infants. The study is opening in Puberto Rico and will expand to several locations in Brazil, Colombia and other areas that are experiencing active local transmission of the virus.

Zika virus is spread primarily through bites from infected Aedes aegypti mosquitoes, although other forms of transmission notably, mother-to-child and sexual transmission also occur. Active virus transmission currently is ongoing in 60 countries and territories. The virus has been linked to a spike in cases of microcephaly, a condition in which babies are born with abnormally small heads and possible neurological damage, sparking international concern. In addition to microcephaly, other problems have been detected in pregnancies and among fetuses and infants infected with Zika virus before birth, including miscarriage; stillbirth, absent or poorly developed brain structures, eye defects, hearing deficits, and impaired growth.

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