

# Microbial identification, its antibiogram and therapeutic interventions in an elephant with multiple abscesses

Deepti Chachra<sup>‡</sup>, Gurpreet Kaur<sup>‡</sup>, Mudit Chandra<sup>‡</sup>, Kiran Vasudeva<sup>‡</sup>, Kuldip Gupta<sup>\*</sup>, Vandana Sangwan<sup>\*\*</sup>, Ashwani Kumar<sup>\*\*</sup> and J. Mohindroo<sup>\*\*</sup>

## Abstract

The present report describes the isolation of *Arcanobacterium pyogenes* from multiple abscesses in a 30 year old female elephant. The isolate was recovered after propagation on blood agar supplemented with 5% de-fibrinated sheep blood. The bacterial colonies were confirmed as *Arcanobacterium pyogenes* by Gram staining and biochemical tests. Based on antibiotic sensitivity pattern, the elephant was treated by intra-muscular administration of gentamicin @4.4 mg/kg, once daily for five days, along with surgical drainage of abscesses under local infiltration anesthesia and daily antiseptic dressing.

## Introduction

Genus *Arcanobacterium* has evolved from considerable taxonomic revisions of Coryneform groups, which demonstrates the existence of a pathogenic role for some of them (Riegel, 1998). *Arcanobacterium (Actinomyces) pyogenes* is a common inhabitant of the upper respiratory and genital tracts of domestic animals. It is also an important opportunistic pathogen isolated from suppurative disease conditions in many species of domestic and wild animals, birds and human beings (Addo and Dennis, 1977; Kotrajaras and Tagami, 1987 and Barbour *et al.* 1991). It has also been isolated from liver abscesses, pneumonia, osteomyelitis, mastitis, abortion, infertility and postpartum uterine infections (Lechtenberg *et al.* 1988, Hillerton and Bramley, 1989; Semambo *et al.* 1991; Ruder *et al.* 1981). In wild animals, *A. pyogenes* has been isolated from turkeys, deer and elephant from cases of osteomyelitis (Brinton *et al.*, 1993 Barbour *et al.* 1991), pneumonia (Palmer *et al.* 1999) and fistula (Ronald *et al.* 2000).

The present report describes the successful microbiological isolation of a pure culture of *Arcanobacterium pyogenes* from multiple abscesses in a 30yr old female elephant presented to the teaching veterinary hospital. The animal was an individual case and the owner used it for religious processions and for his livelihood. In addition the

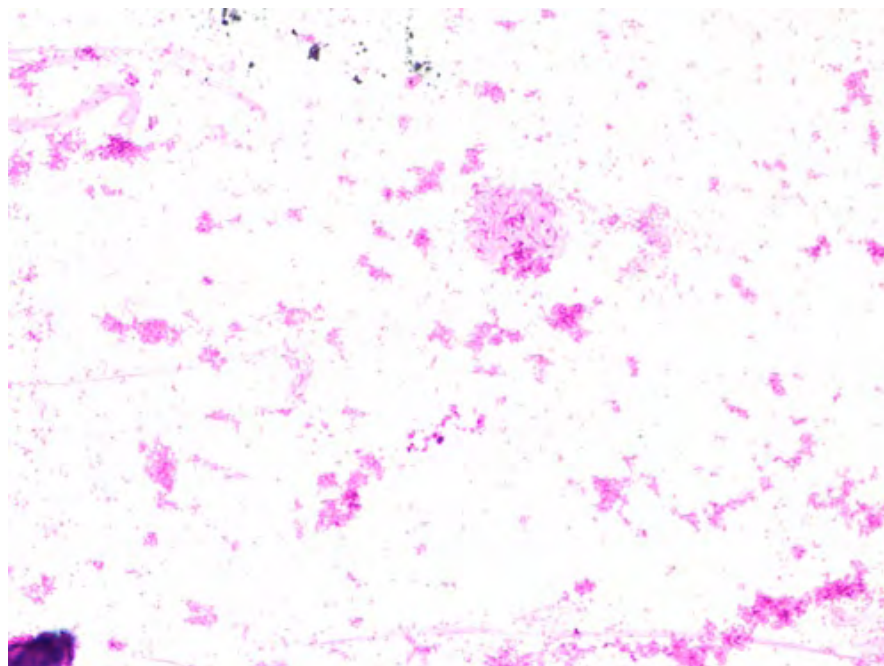


Fig. 1. Bacteria in pus smear 100 x Leishman stain

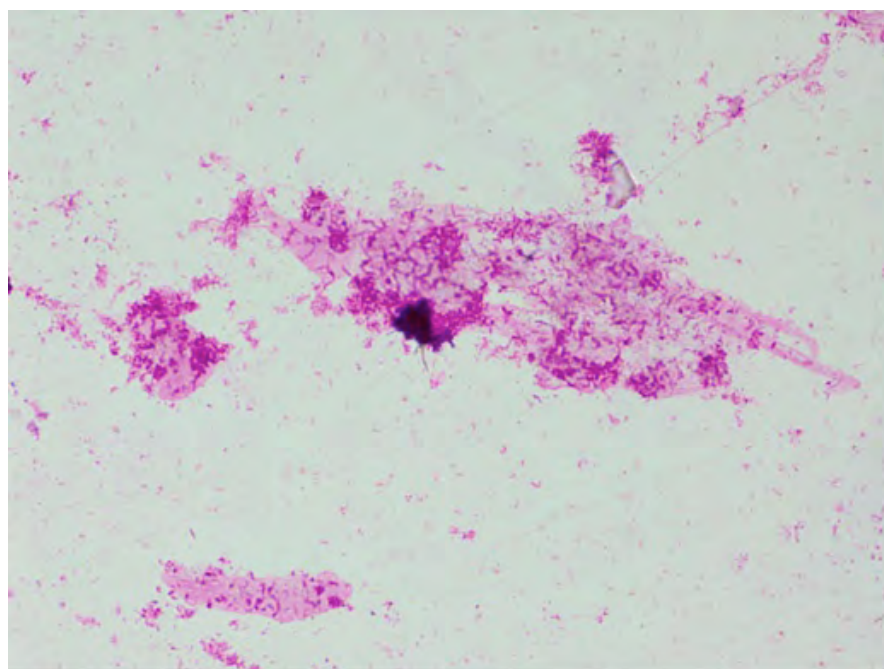


Fig. 2. Bacteria in pus smear 100 x Leishman stain

antibiotic sensitivity pattern of the organism was also studied to treat the elephant.

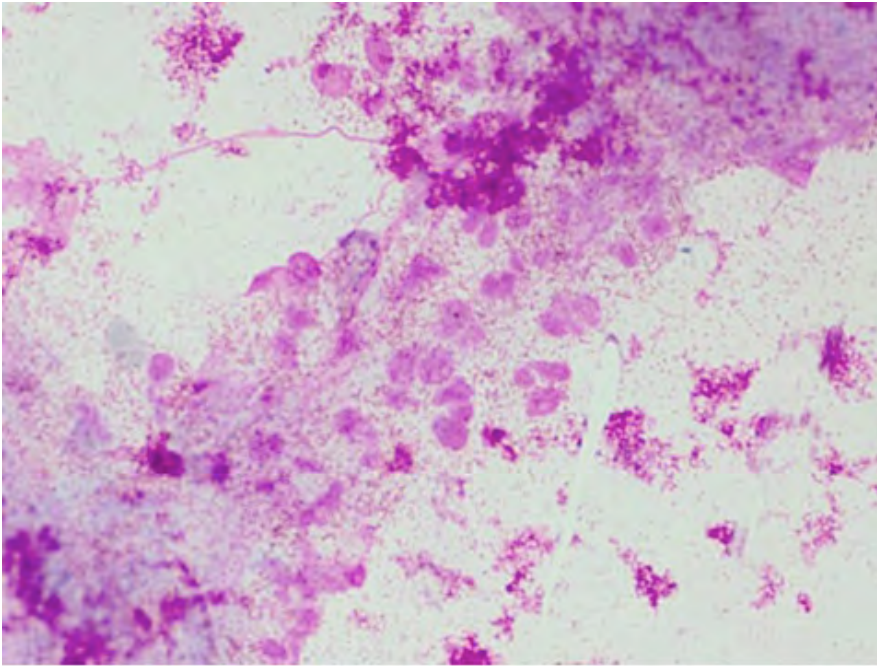
## Materials and Methods

### Case presentation

A female elephant of 30 years age was presented to Teaching Veterinary Complex, GADVASU, Ludhiana with

multiple abscesses on elbow and feet along with necrosis of ear pinnae for

Departments of Veterinary Microbiology<sup>‡</sup>, Veterinary Pathology<sup>\*</sup>and Veterinary Surgery and Radiology<sup>\*\*</sup>, College of Veterinary Sciences, GADVASU, Ludhiana  
Email: [deeptivet@rediffmail.com](mailto:deeptivet@rediffmail.com)  
(corresponding author)



**Fig. 3. Degenerated neutrophils and bacteria 100x Leishman Stain**

**Table 1. Biochemical characteristics of *Arcanobacterium pyogenes***

Biochemical Test	Result
Catalase production	Negative
Nitrate reduction	Negative
Gelatin liquefaction	Positive
Acid production from Glucose	Positive
Mannitol	Positive
Sucrose	Negative
Xylose	Positive

the last 2 months. The elephant was reluctant to move but the appetite of the elephant was normal. Clinically a large draining tract was observed at the point of elbow of the right forelimb while other small tracts were seen in inter digital spaces of all the limbs. Under physical restraint and local anaesthesia the draining tract of elbow was explored for counter opening proximally. The tract was approximately 25 inches long and was directed caudo-medially. A possible sterile sample of the pus was taken at this time for microbiological examination.

**Bacteriological isolation**

Sterile swabs were used for the bacteriological examination. Pus sample was inoculated onto blood agar supplemented with 5% de-fibrinated sheep blood with a sterile loop and were incubated for 48 hours at 37°C. Colonies that were small, circular, dew drop like on blood agar were picked up for further analysis. *A. pyogenes* was identified by Gram staining and

biochemical tests viz., catalase production, nitrate reduction, gelatin liquefaction and sugar fermentation viz. glucose, mannitol, xylose and sucrose as recommended by Carter and Cole, 1995. The antibiotic sensitivity test was performed as described by Bauer and Kirby (1966).

**Haematological examination**

Haematological examination of the blood sample was done as per the standard protocol of Jain, 1986.

**Results and Discussion**

Abscess formation in elephants occurs as a result of contusions due to repeated trauma or complication of penetrating wounds (Kumar and Saini 2004). Extremities such as point of elbow and knee area are most prone to abscess formation. Treatment consists of surgical exploration of the abscess tract, complete drainage followed by flushing with antiseptic solutions (Kumar and Saini 2004). All the tracts were flushed daily with 0.1% betadine solution in normal saline followed by

stuffing of cotton bandages dipped in magnesium sulphate, glycerine and betadine paste.

*Arcanobacterium pyogenes* was isolated in pure culture form after 24 h of incubation at 37°C. Small, pinpoint, beta-haemolytic colonies were seen after 24h of incubation (Fig.1). Gram positive bacilli were observed. Biochemically, the bacteria were negative for catalase production and nitrate reduction and liquefied gelatin (Table 1). The sugar fermentation revealed acid production from glucose, mannitol and xylose. Presence of *Arcanobacterium* from diseases has also been reported by Kavitha *et al.* 2010. The antibiotic sensitivity revealed high sensitivity to Ofloxacin and Gentamicin; intermediate sensitivity to Doxycycline while it was resistant to Amoxycillin, Ampicillin, Penicillin G and Cloxacillin. Sensitivity to gentamicin has also been reported by Kavitha *et al.* 2010. Isolation of bacterial strains of various genera viz. *Actinomyces pyogenes*, *Pseudomonas aeruginosa*, *Micrococcus luteus*, *Klebsiella orytoxa*, *Proteus mirabilis*, *Staphylococcus aureus* and *Corynebacterium ulcerans* from fistula in an elephant has earlier been reported by Ronald *et al.* 2000.

Examination of smears from pus revealed large number of neutrophils along with bacilli (Figs. 1,2,3,). Hematological examination revealed a total leukocyte count (24,600/mm<sup>3</sup>) which is within upper limits (Silva and Kuruwita, 1993) while the differential count indicated neutrophilia and lympho-cytopenia (62% neutrophils; 27% monocytes; 9% lymphocytes and 1% eosinophils and basophils each) along with toxic neutrophils and shift to the left which is suggestive of suppuration (Jain, 1986).

Based on antibiotic sensitivity spectrum, the elephant was prescribed gentamicin 4.4 mg/kg, intra muscularly (i/m), once daily for 5 days along with ketoprofen 30 ml i/m once daily for 3 days.

The animal started improving after 10 days and it was discharged from hospital with necessary advice. The present study concludes the identification and isolation of pure culture of *Arcanobacterium pyogenes* from multiple abscesses in an elephant.

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### **Announcement: Bombay Natural History Society (BNHS) requires Researchers**

The Bombay Natural History Society (BNHS) a 130 years old premier scientific research organization engaged in conservation of nature, research in natural history and wildlife would like to recruit Research Fellows for its following projects sponsored by the Government of India, Ministry of Environment & forests (1) Bengal Florican Project: (Studying movement pattern and dispersal of the Bengal Florican *Houbaropsis bengalensis*: a Satellite Telemetry Pilot Project) and (2) Jerdon's Courser Project (State-of-art technology to study nocturnal and extremely elusive Jerdon's Courser (*Rhinoptilus bitorquatus* and its habitats).

**Brief Job Requirement:** The candidates for the Bengal Florican Project will have to carry out field research work in Uttar Pradesh, Assam and Arunachal Pradesh and for Jerdon's Courser Project the candidates will have to carry out fieldwork on species Jerdon's Courser near Cudappah, in Andhra Pradesh.

**Desired Educational qualifications:** The candidates should be M.Sc. in Wildlife Biology/ Zoology with first class and will be encouraged to enroll for Ph.D. Should have the knowledge of computer programmes. Age: Below 30 years, Salary: negotiable.

Interested candidates may send their applications within 15 days along with their updated C.V. to the Director, Bombay Natural History Society, Hornbill House, Shaheed Bhagat Singh Road, Opp. Lion Gate, Mumbai – 400001 or by email to: [rahmani.asad@gmail.com](mailto:rahmani.asad@gmail.com)