Diclofenac in Asia and Africa
- repeating the same mistake?

For the past fifteen years, diclofenac, a non-steroidal anti-inflammatory drug (NSAID), has been available for veterinary use over pharmacy counters throughout the Asian countries of Pakistan, India and Nepal. In these countries this drug has been widely used as a pain killer for the symptomatic treatment and management of inflammation, fever and painful conditions associated with disease or injury in domestic livestock. However, when applied empirically, without an accurate, professional diagnosis, it rarely results in a cure and many animals still die in spite of treatment.

Diclofenac is manufactured by a South American pharmaceutical company which is reported by BirdLife International’s African office to be already exporting the drug to 15 African countries.

Diclofenac, now out of patent, is marketed under many brand names in many different countries. It was originally developed by a pharmaceutical company for human use, which is actually the primary market.

On the Indian subcontinent it is customary to put out dead livestock for consumption by vultures and other scavengers, and the availability of such carcasses to vultures is high even in areas where meat-eating is practised.

Throughout South Asia, vultures and other scavengers have played a hugely important hygienic role in clearing up dead livestock.

Vultures are exposed to diclofenac when they consume the carcasses of livestock that have been treated with this drug and have subsequently died within a few days of treatment.

The veterinary drug diclofenac has been the cause of vulture decline in Asia. Scavengers have to be saved to keep the environment clean and free from diseases due to unattended carcasses.
Gyps spp. vultures (the Griffon vultures) are extremely sensitive to diclofenac, which even in very low concentrations causes acute kidney failure and death.

In South Asia, the populations of the endemic Oriental white-backed (Gyps bengalensis), slender-billed (Gyps tenuirostris) and long-billed (Gyps indicus) vultures have declined dramatically by more than 95% since the early 1990s, and the evidence suggests that the few that are left continue to decline at between 15% and 50% per year. These three species which, together, just 15 years ago, used to number tens of millions (possibly 40 million of one species in India alone), are now almost unbelievably at serious risk of global extinction and are listed as ‘Critically Endangered’ by the International Union for Conservation of Nature (IUCN 2004).

Scientific evidence following the observation of waste disposal practices of carcasses confirms without doubt that the veterinary use of diclofenac is the main cause of these declines (Green et al. 2004) throughout the Indian subcontinent.

However, there are effective, safe, alternative drugs available, (e.g. meloxicam), which it is hoped will soon replace diclofenac in the veterinary pharmacopeia. Fortunately meloxicam is also out of patent and could now be produced at comparable prices to diclofenac. It is hoped that some other substitute drugs may also prove to be ‘vulture-safe’, although each drug should be thoroughly tested, as was the case with meloxicam, to confirm this.

As a consequence of the collapse of South Asian vulture populations, national and international conservation organisations have concluded that it is essential to ban the use of diclofenac in domestic livestock so as to remove it as a toxic contaminant of the food of wild, scavenging vultures. At a meeting of the National Wildlife Board in March 2005, the Government of India announced that it intended to phase out the veterinary use of diclofenac within six months. In 2006, the Governments of India, Pakistan and Nepal all banned the manufacture of diclofenac in these countries. This sends a very clear signal and is welcome. However, retail sale of diclofenac not manufactured for veterinary use remains legal in these countries, so full bans on retail sale for veterinary use may be necessary.

A further and potentially serious ecological consequence of the disappearance of the scavenging vultures throughout the Indian subcontinent is that there may be an increase in the numbers of feral domestic dogs, which are major vectors of rabies, a disease that kills up to 20,000 Indians (the majority of them children) each year (Sudarshan et al. 2007). In the absence of vultures, the increased availability of carrion upon which feral dogs feed can be expected to boost their populations. It is reported (2003 data) that there has already been a 35% increase of feral dogs in India. These animals also pose many other health and safety threats.
The veterinary use of diclofenac in African countries

Should the use of diclofenac in African countries result in a similar chain of exposure to vultures, it could quickly threaten the Cape vulture (*Gyps coprotheres*) already in grave danger of extinction, and would further threaten Ruppell's griffon vulture (*Gyps rueppellii*), the white-backed vulture (*Gyps africanus*), and the Eurasian griffon vulture (*Gyps fulvus*).

Gyps vultures are very wide ranging. For example, in just one year a Cape vulture, satellite-tagged in Namibia, covered at least 64,000 km through six countries: Namibia, Angola, Botswana, Zambia, Zimbabwe and South Africa.

Exposure to diclofenac in a single carcass in any one of the range states of these species could prove fatal. Consequently, veterinary use of the drug could threaten the more common species as well as those that are already rare.

Surveys by veterinarians and zoo staff have documented the outcome of experimental exposure of over 870 scavenging birds of 79 species to NSAIDs. Toxicity was reported for drugs, including the widely used carprofen and flunixin, in raptors, storks, cranes and owls, suggesting that the potential adverse impact of some NSAIDs may extend beyond the *Gyps* vultures and could be significant for all vultures as well as for other bird species.

In Africa these might include the threatened Egyptian vulture (*Neophron percnopterus*) the white-headed vulture (*Trigonoceps occipitalis*) and the lappet-faced vulture (*Torgos tracheliotus*).

In contrast, the above surveys reported no mortalities for the NSAID meloxicam, which was administered to over 700 birds of 60 different species. This study was followed up by rigorous experimental testing on both African and Asian *Gyps* vultures. No adverse effects were detected. The relative safety of meloxicam indicates that it is a suitable substitute NSAID for the toxic diclofenac.

A survey of veterinarians and veterinary suppliers by the Wildlife Conservation Society of Tanzania is underway to establish whether diclofenac is already widely stocked and sold in Tanzania. Partners in other African countries will be undertaking similar surveys.

As a consequence of the collapse of the South Asian vulture populations, national and international conservation organisations have concluded that it is essential to ban the veterinary use of diclofenac for livestock so as to remove it as a contaminant of the food of wild vultures and to replace it, where there is a demand for an NSAID, with the non-toxic, safety-tested drug, meloxicam.

Diclofenac is not licensed for veterinary use in Europe or North America. However, it should be noted that diclofenac is widely licensed for medical use in...
many countries for the treatment of human ailments, and in some places the human drug is reaching the veterinary market.

In India, where vultures are central to the customs of the Parsee community, human corpses are put out for consumption by vultures. Here, there is an added danger that where humans have been treated with the drug they may contain sufficient diclofenac to poison a scavenging vulture.

The key solution in South Asia is seen as converting all veterinary practitioners and livestock owners to using meloxicam (or any other demonstrably ‘vulture-safe’ alternative) instead of diclofenac.

The Bombay Natural History Society’s Vulture Advocacy Programme is working with the Government of India to achieve this and is, with support from the United Kingdom’s Royal Society for the Protection of Birds (RSPB) and other partners, establishing costly conservation breeding programmes to keep alive the option of reintroduction in the future.

Surely we can avoid the very real risk of repeating this conservation and environmental catastrophe across Africa (or elsewhere) by preventing diclofenac from being taken up in veterinary practice and sold over pharmacy counters. If needed, vulture-safe alternatives, like meloxicam should be used.

During the OIE Conference in Dakar Senegal in March 2008 on the Harmonisation and improvement of registration and quality control of Veterinary Medicinal Products in Africa, a Resolution was adopted unanimously by more than 160 Delegates present to request Members to consider their national situation with the aim to seek measures to find solutions to the problems caused by the administration of diclofenac in livestock.

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