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Review

Ivermectin - a necessity for the control of neglected tropical diseases in Sri Lanka

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Abstract

Ivermectin, a broad spectrum anti-parasitic agent, has been recognised by the World Health Organization as an essential medicine for decades. It has never been registered for human use in Sri Lanka. This review aims to discuss the usefulness of ivermectin with regards to locally endemic neglected tropical diseases, namely, strongyloidiasis, trichuriasis, lymphatic filariasis and scabies.

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Introduction

Ivermectin is a semisynthetic avermectin, effective against a broad range of parasites (1). Discovered in the 1970s, it was introduced for veterinary use in the early 1980s. By 1987, ivermectin was registered for human use to treat onchocerciasis, a disease also known as river blindness and caused by a parasitic filarial worm (2). In the same year, it entered the list of essential medicines recognised by the World Health Organization (WHO) and has been there ever since (3). Ivermectin is used to treat a variety of nematode infections, including onchocerciasis, strongyloidiasis, cutaneous larva migrans, lymphatic filariasis, gnathostomiasis and trichuriasis, as well as for treatment of ectoparasitic infections such as pediculosis and scabies (2). Ivermectin is well tolerated, the side effects are relatively minor and include loose stools, cough, headache, fever, fatigue, nausea and tremor (4). Despite its efficacy against a vast range of parasitic diseases, excellent safety profile and recognition as an essential medicine by the WHO, ivermectin is not registered for human use in Sri Lanka, as of the time of writing (5). It is, however, widely used in the local

veterinary setting. The authors are currently lobbying towards the registration of ivermectin in Sri Lanka. Therefore, this review aims to discuss the usefulness of ivermectin with regards to several parasitic neglected tropical diseases endemic to Sri Lanka, to raise awareness among the medical fraternity.

The pharmacology of ivermectin

Ivermectin is highly lipid soluble, widely distributed in the tissues and metabolized by the liver via the cytochrome P450 pathway. The drug is mainly excreted via faeces. The elimination half-life of ivermectin in healthy adults is approximately 12 hours, although the antiparasitic effects persist for several months after a single dose of the drug, likely due to its sustained action on parasite physiology and prolonged binding to target sites (6). Ivermectin is not recommended for pregnant women or children weighing less than 15 kg, as its safety in these groups has not been clearly established (7). However, researchers are advocating the use of ivermectin in children weighing under 15 Kg, as a recent individual patient data meta-analysis revealed that ivermectin is safe in this category (8). It is excreted in breastmilk in low concentrations and is indicated to treat lactating mothers if the benefit outweighs the risk (7).

Strongyloidiasis

Strongyloidiasis is primarily caused by the soil transmitted helminth *Strongyloides stercoralis*. More than 600 million are estimated to be infected by this parasite, globally (9). Humans are infected by skin penetration of the filariform larvae. The worm's unique ability to reproduce asexually, as well as to cause autoinfection, makes it important as an opportunistic pathogen that can cause severe, even fatal disease in the immunocompromised host (10). Sri Lanka has achieved a remarkable reduction in the prevalence of other soil transmitted helminthiases such as ascariasis, hookworm disease and trichuriasis following decades of mass drug administration and improvement of sanitary facilities but little is known about the epidemiology of strongyloidiasis in Sri Lanka since research has been scarce (11). Numerous case reports have been published on the presence of this parasite in the immunocompromised host (12,13).

Several cases of strongyloidiasis have been reported among patients with end-stage renal disease (ESRD) in Sri Lanka in the recent past, but only when it was symptomatic and in a more severe stage (14,15). Research carried out in Colombo, Sri Lanka in 2021-2022 revealed a molecular prevalence (PCR) of 11.4% (i.e., 14/123) of strongyloidiasis among patients at risk of immunosuppression a (16). Amongst them were six patients with ESRD. A secondary analysis revealed an approximate disease positivity of 1/3 (i.e., 6/22) among the patients with ESRD (17). This was not the first study to evaluate the presence of strongyloidiasis in Sri Lanka: research published locally, albeit in abstract form seventeen years ago, found a prevalence of approximately 10% among patients with renal disease (18).

The preliminary findings of a school-based survey carried out in 2023 in the Anuradhapura District shed more light on the epidemiology of strongyloidiasis in Sri Lanka. Anuradhapura is endemic to renal diseases yet was considered as low risk for soil

transmitted helminthiases (19). The above survey revealed a 5% prevalence of strongyloidiasis among primary school children, based on faecal culture and microscopy (20). The deepening of the economic crisis, with a more than two-fold increase in poverty from 2019 to 2025 could be one reason for this observation (21). Another is the fact that human strongyloidiasis can have a zoonotic component, particularly with *S. stercoralis* and *S. fuelleborni*. Dogs have been identified as potential reservoirs for *S. stercoralis*, sharing genetically similar strains with humans, while *S. fuelleborni*, typically a primate parasite, has been reported in human infections in parts of Africa and Asia suggesting transmission from non-human primates in close-contact settings (22,23). Though not extensively researched, *Strongyloides* spp. has been found in stray dogs in Sri Lanka (24). The high number of stray dogs in the country, could potentially contribute towards the onward transmission of strongyloidiasis.

Ivermectin is the treatment of choice for strongyloidiasis and is administered as a 200µg/kg single dose, which is then repeated one week later. In the case of severe strongyloidiasis, 200µg/kg is given daily for three days (10,25).

The WHO recommends mass drug administration of ivermectin for strongyloidiasis in settings where the prevalence among school-aged children exceeds 5% (26). Whether this applies to Sri Lanka warrants discussion. However, the registration and availability of ivermectin is necessary to manage and prevent disease progression in at-risk populations.

Trichuriasis

Trichuriasis is caused by the soil transmitted helminth *Trichuris trichiura*. The prevalence of trichuriasis in the Southeast Asian region is estimated to be approximately 21% (27). Long endemic in Sri Lanka, the most recent nationwide survey of soil transmitted helminthiases (ascariasis, hookworm disease and trichuriasis) carried out in 2017, found a prevalence of 0.25% for trichuriasis among primary school children (28). The distribution of disease was heterogenous with the prevalence exceeding 2% in children living in urban slums.

It is widely accepted that single-dose albendazole or mebendazole has less efficacy in the treatment of trichuriasis than against ascariasis and hookworm disease (29). The superior efficacy of combination therapy with single dose ivermectin and albendazole compared to single dose albendazole in the treatment of trichuriasis has been demonstrated by Sri Lankan researchers nearly 25 years ago (30). A clinical trial published in 2025, which was carried out by the Stopping Transmission of Intestinal Parasites (STOP) consortium proved the same (31). Reinfection rates were found to be higher with albendazole monotherapy compared to albendazole + ivermectin combination therapy (32). The combination of two drugs with different modes of action reduces the risk of the development of drug resistance and increases the efficacy of the treatment (33).

Given the growing economic challenges and robust evidence supporting the effectiveness of ivermectin, registering ivermectin in Sri Lanka is a timely and important public health intervention.

Lymphatic filariasis

Lymphatic filariasis (LF) is a vector borne disease known to result in severe disfigurement and morbidity. The causative parasites in Sri Lanka are *Wuchereria bancrofti* (Bancroftian filariasis) and *Brugia malayi* (Brugian filariasis). Although the country was certified as having eliminated LF as a public health problem in 2016, subsequent surveys conducted by the Anti Filariasis Campaign (AFC) in 2019–2021 found evidence of residual transmission of Bancroftian filariasis, mainly along the western and southern coastal border (34). Brugian filariasis has also re-emerged; sporadic cases have been detected in all three LF endemic provinces during the past two decades and is attributed to a potential zoonotic reservoir (35-37). Additionally, more than 350 immigrants tested positive for filariasis by the filarial antigen test (Bancroftian filariasis) in 2024 alone (38). Moreover, more than 1000 patients were newly registered in lymphoedema clinics in 2024 (38).

In Sri Lanka, the current treatment regimen for both Bancroftian and Brugian filariasis is combined treatment with albendazole 400mg single dose along with diethylcarbamazine 6mg/kg/day for 12 days (39). The latest recommendation by the WHO for mass drug administration and treatment of lymphatic filariasis include triple therapy with ivermectin 200µg/kg + diethylcarbamazine 6mg/kg + albendazole 400mg (IDA) (40,41). This recommendation is due to the superiority of the IDA regimen compared to the standard double therapy of diethylcarbamazine/albendazole or ivermectin/albendazole in terms of efficacy and safety (42,43). Due to the presence of active foci of Brugian filariasis in Sri Lanka, in 2022, the Regional Programme Review Group of the Southeast Asian Region of the WHO suggested to consider implementing targeted IDA in hotspot communities found to have >1% microfilaremia during parasitological surveillance (44). Adoption of this treatment regimen was also recommended by the review team of the WHO upon evaluation of Sri Lanka's Vector Borne Disease Programme in 2024, to treat infected individuals and preventive chemotherapy in migrants (45). Triple therapy with ivermectin, diethylcarbamazine and albendazole to treat patients positive for *Brugia malayi* has been found useful in the Belitung Region in Indonesia, even after discontinuation of mass drug administration 11 years ago (46).

The persistent transmission of Bancroftian filariasis in some hotspots, the re-emergence of Brugian filariasis, continued detection of infection among migrant workers and the WHO recommendations, all constitute strong reasons for registration of ivermectin in Sri Lanka to prevent the resurgence of LF and to reduce disease burden.

Scabies and other ectoparasitic infestations

Scabies is a dermatological condition caused by the mite *Sarcoptes scabiei*. The WHO estimates that 200 million are affected by scabies at any given time (47). A 2024 systematic review and meta-analysis revealed a pooled prevalence of approximately

11.9% and 11.4%, globally and in the Southeast Asian region respectively (48). The epidemiology of scabies in Sri Lanka is not well documented; a 2019 study revealed a 1.5% prevalence among school children in the Gampaha District (49). Patients with scabies, including crusted scabies (Norwegian scabies), are regularly seen by dermatologists, but it is not a notifiable disease and is thus under-reported. The recommended treatment in Sri Lanka is 5% permethrin cream or 25% benzyl benzoate lotion. However, the treatment regimen is not always practical in real life settings. Moreover, reports of patients not responding to these first-line medications do surface. Ivermectin given as single dose of 200 µg/kg is safe, effective and practical in the context of treating the household contacts and even in treatment in institutionalised settings (50,51). Oral ivermectin remains the treatment of choice for crusted scabies globally as well as locally (50-52).

Head lice infestation caused by *Pediculus capitis* is very common in Sri Lanka and causes much distress to those affected. Despite data being scarce, a 42% prevalence was found among school going children in the Gampaha District in 2019 (49). There have been reports of permethrin shampoo, the first line treatment, being ineffective although scientific data in the local setting is lacking, except for one ex-vivo study (53) The alternative treatment available in the market is dimethicone shampoo, which is more expensive. Interestingly, topical dimethicone is not registered by the National Medicine Regulatory Authority of Sri Lanka (NMRA), either (5). Oral and topical (0.5%) ivermectin remains an alternative in resistant head lice infestations (54).

Ivermectin use in Sri Lanka

In the recent past, during the COVID-19 pandemic, ivermectin was imported to Sri Lanka under a waiver of registration due to speculation about its usefulness during the pandemic (55). A clinical trial was carried out on patients with mild and moderate COVID-19 and it was found to be relatively safe with minor adverse effects (56). However, no improvement of the clinical symptoms of COVID -19 was ~~not~~ observed in patients who received ivermectin treatment compared to the placebo-treated arm, despite a significant reduction of the viral load (56). These findings are in line with a 2024 systematic review and meta-analysis, which found that ivermectin treatment did not reduce the morbidity and mortality of patients with early COVID -19 compared to the controls (57).

The usefulness of ivermectin in the treatment of chronic strongyloidiasis in Sri Lanka was first described by Wijesundera and Sanmuganathan in a case report as early as 1992 (58). Clinical trials with ivermectin for the treatment of lymphatic filariasis and trichuriasis carried out two decades ago found it to be safe (30,59). This clinical trial carried out by Ismail and colleagues utilised 3 single-dose treatment arms (albendazole 400mg + ivermectin 200µg/kg, albendazole 400mg + diethyl carbamazine 6mg/kg, and albendazole 600mg + ivermectin 400µg/kg) for treatment of patients with asymptomatic microfilaremia. The patients were observed for two years by night blood film for microfilaremia and antigen test for adult parasite. All three arms reduced microfilaremia and antigen positivity significantly, the greatest activity being demonstrated in the albendazole 400mg + diethyl carbamazine 6mg/kg treatment arm (59).

Ismail and colleagues also conducted a second clinical trial on patients who were positive for trichuriasis. These patients were also allocated to three single-dose treatment arms – albendazole 400mg, albendazole 400mg + ivermectin 200µg/kg, and albendazole 400mg + diethyl carbamazine 6mg/kg. The faecal samples of these patients were examined three weeks later to assess the cure rate and the egg reduction rate. Patients given albendazole+ ivermectin demonstrated a significantly higher cure and egg reduction rate compared to the other two arms (30).

Cost and potential misuse.

Ivermectin is relatively cheap: an internet search reveals the starting retail price in Bangladesh to be approximately equivalent to LKR 7.50 for a tablet of 3mg, LKR 12.50 for a tablet of 6mg and LKR 25 for a tablet of 12mg (60).

The reported misuse of ivermectin was due to speculation that it is of value in COVID -19 infections but this has since been proven false (57). In Sri Lanka too, the demand for ivermectin increased during the pandemic, accounting for black-market sales at exorbitant prices (55). Though it is prudent to anticipate its misuse and take precautionary measures in the light of growing antimicrobial resistance, Sri Lankans should not be deprived of a drug which is considered an essential medicine by the WHO, and for which there are clear indications for use in this country. Controlled distribution of ivermectin would be beneficial. If this cannot be done through the private sector, its distribution could be limited to outlets of the State Pharmaceuticals Corporation (SPC). It should also be noted that ivermectin's reassuring safety profile means that unnecessary use of the drug is unlikely to carry serious health consequences.

Conclusion

Several parasitic infections with strong indications for treatment with ivermectin still exist in Sri Lanka. These infections primarily affect socioeconomically disadvantaged communities and are thus neglected by mainstream society. Importing ivermectin on a named-patient basis or under a waiver of registration is neither sustainable nor practical. Reliance on donations from external organizations such as the WHO is also not a long-term solution. The only feasible options are to identify one or more reliable pharmaceutical suppliers from the private sector or to import it through the SPC after registration with the NMRA. Though it may not be needed on a large scale, given its proven efficacy and the local burden of NTDs, registering ivermectin, even as an orphan drug, is of vital importance.

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