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Figure 4. Example of the patient education tools embedded in the *Electronic Chairside Checklist*. These include videos produced by the Centers for Disease Control and Prevention (CDC). In development by the Nephrologists Transforming Dialysis Safety (NTDS) Vascular Access Workgroup of the American Society of Nephrology with the CDC.



Community-Acquired Acute Kidney Injury in Asia

By Vivek Kumar and Vivekanand Jha

Asia is synonymous with diversity, which is reflected in the epidemiology of kidney diseases, especially acute kidney injury (AKI). In contrast to people in the industrialized developed countries, most Asian people, especially those living in rural areas with relatively limited access to healthcare, continue to bear a large burden of AKI. This condition develops in these communities secondary to locally prevalent health issues of public health importance.

The 0by25 Global Snapshot study by the International Society of Nephrology showed that 80% of the burden of AKI in low- and middle-income countries of Asia is community acquired. Community-acquired AKI (CA-AKI) predominantly affects young, previously healthy individuals who often work outdoors in rural areas and are exposed to a variety of occupational, environmental, or sociocultural risk factors that predispose or lead to the development of AKI. These factors are often the culmination of a complex interplay between geographic, ecologic, social, and economic conditions prevalent in those regions. They include exposure to tropical infections like malaria, leptospirosis, dengue, or acute diarrheal illnesses; toxic envenomation after animal or insect bites (e.g., snakebite); the use of unproven traditional or local systems of medicine that frequently include nephrotoxic compounds; delays in seeking appropriate care; and lack of hygiene, sanitation, or an adequate supportive healthcare infrastructure.

This pattern of development for CA-AKI is in striking contrast to that for hospital-acquired AKI, which is seen in

developed regions and high-income countries. The usual prototype of a patient at risk of AKI in such regions is an individual with preexisting comorbidities like chronic kidney disease, diabetes, or hypertension who is admitted to the hospital for complications related to chronic disease, or in whom AKI develops after a healthcare intervention like major surgery. The fact that mortality in children with AKI is 55 times higher in low- and middle-income countries than in high-income countries reflects the public health importance of addressing AKI in such settings.

Infections are the leading cause of CA-AKI in Asia. The tropical Asian climate favors the persistence and growth of microbes and disease vectors. Although most countries have undertaken community-based measures to control and prevent tropical infections through national programs and international collaborative efforts, the absolute burden still remains very high. At one end, Sri Lanka and the Maldives have been recently declared malaria free, whereas at the other end, southeast Asia still reports the second highest number of malaria cases after Africa.

The epidemiology of infectious diseases has changed in Asia over recent decades, reflecting the changing host-pathogen interactions resulting from habitat destruction, industrialization, climate change, and indiscriminate use of drugs. Examples include the recognition of human *Plasmodium knowlesi* malaria, previously seen in Old World monkeys in countries like Malaysia, Cambodia, and Indonesia; the identification of semi-domestic farm animals as maintenance or accidental hosts for leptospirosis in Sri Lanka; the dramatic increases in dengue viral infections; and the reemergence of rickettsial diseases like scrub typhus across India and China. All of these infections can cause AKI.

Other important risks for CA-AKI are animal or insect bites—occupational hazards for those living in rural areas and working outdoors for their livelihood. South Asia and southeast Asia report the highest number of snakebite-related envenomation and deaths in the world. AKI is common in vasculotoxic viper bites. Stinging insects like wasps, hornets, and bees can also cause AKI, especially when a swarm attacks an individual and injects large doses of venom.

Finally, AKI after the consumption of exotic tropical plants continues to be encountered in Asia. The develop-

ment of acute oxalate nephropathy leading to AKI after star fruit juice consumption is a classic example. Other plants whose consumption has been reported to lead to AKI include *Gloriosa superba* and *Cleistanthus collinus*. The unregulated and easy availability of chemicals, insecticides, and pesticides allows their abuse for homicidal or suicidal intent. AKI can develop after the ingestion of copper sulfate, paraquat, or aluminum phosphide. A lack of healthcare facilities, and reliance on unproven traditional or indigenous medicines owing to social or cultural beliefs, frequently expose underprivileged people to local drugs that contain nephrotoxic compounds and heavy metals.

AKI in obstetric patients in the settings of puerperal sepsis, unsupervised pregnancies, unsafe deliveries, or illegal abortions by untrained personnel is still common among young women from poor socioeconomic groups. Acute cortical necrosis is a dreaded complication especially associated with obstetric AKI, which portends poor renal recovery.

Despite the nonmodifiable nature of a few risk factors (e.g., geographic and ecologic factors), a vast majority of CA-AKI cases in Asia are potentially preventable. Concerted efforts over three decades in Bangladesh have almost eliminated a mortality rate of 27% that was previously seen with AKI and acute diarrheal illnesses during floods. Such successes underline the need to adopt public health approaches to the elimination of preventable mortality due to AKI—the mission behind the 0by25 initiative of the International Society of Nephrology. Awareness among the general public, focused social groups, administrative stakeholders, and various healthcare professionals, and collaborative efforts to implement measures for preventing CA-AKI by early identification in the community and timely referral to appropriate healthcare facilities, are keys to improving outcomes. ■

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