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Blood Transfusions from Survivors Best Way to Fight Ebola

A panel of experts from the World Health Organization says blood plasma and whole blood transfusions should have priority—for now

September 5, 2014 | By Dina Fine Maron |

Treating Ebola patients with blood transfusions from survivors of the disease should be the immediate priority among all the experimental therapies under consideration for this outbreak, World Health Organization (WHO) experts said Friday after reviewing the status of all the potential experimental therapies and vaccines. “We agreed that whole-blood therapies and convalescent serum may be used to treat Ebola virus disease and that all efforts must be invested into helping affected countries use them safely,” Marie-Paule Kieny, assistant director general for health systems and innovation at WHO told reporters. “This is something that would be ready near term.” None of the considered Ebola regimes have yet been adequately tested in humans.

Credit: PhotoDisc/GettyImages

Because survivors of an Ebola infection would typically have produced effective antibodies against the virus (otherwise they wouldn't have survived), transfusions of their blood into a newly infected individual may help that person survive the often fatal disease. Such blood preparations, drawn from volunteers, could be ready before the end of 2014, according to preliminary WHO estimates put out earlier this week. “We have to change the sense that there is no hope in this situation to a realistic hope,” Kieny said during a press conference Friday. She has called for other countries to help affected west African nations to build their capacity to safely do the blood drawing and preparation for what needs to be reinfused into the patients.

Such blood transfusions have not yet been systematically studied in humans for Ebola (although such transfusions have been used in limited circumstances including, reportedly, when U.S. physician Kent Brantly was infected with Ebola in Liberia and on others during an earlier outbreak elsewhere in 1995). Moreover, levels of Ebola fighting antibodies are not uniform in different people and some experts have even speculated that such transfusions could potentially do harm. Still, WHO experts concluded that this is the best approach because it is theoretically feasible to recruit large numbers of Ebola survivors, collect blood from them, screen it for disease and use it to potentially help patients. The edict, from some 200 experts and scientists at WHO headquarters in Geneva, was a follow-up to an earlier Ebola ethics review last month that concluded it would be ethical to give patients experimental therapies when and if they are available.

Meanwhile the two potential Ebola vaccines, currently in clinical trials, will have initial safety data in November 2014. If proved safe,

they should immediately be first given to health care workers and other front line staff like burial and sanitation workers, the WHO experts concluded.

The news came on the heels of public statements from top United Nations officials that underscore how challenging it will be to contain the disease in the coming months. A scale-up of the Ebola response is needed at "three to four times" what is currently in place and would take at least $600 million and perhaps a lot more to contain it, David Nabarro, head of the U.N. response to the Ebola outbreak, told reporters on Wednesday. Such a surge of funds and resources—higher than earlier estimates—seems unlikely to materialize fast enough to contain this virus even as new cases erupt in west Africa.

Moreover, any hope of quickly quelling the Ebola outbreak was all but extinguished earlier this week when WHO announced that the virus had spread to Port Harcourt, Nigeria's oil hub. The grim report confirmed that three individuals were infected in the southern Nigerian city—meaning the outbreak had spread beyond Lagos and the country has now had 21 cases. And more than 200 contacts from the new cases are now being monitored for signs of the disease. So far there have been 1,841 reported Ebola deaths from this outbreak and more than 3,000 cases. WHO estimates suggest the virus will not be contained until 2015. The outbreak is also continuing to spread in Guinea, Sierra Leone and Liberia. In nearby Senegal only one case has been confirmed so far and WHO indicates there have been no reported Ebola deaths or other suspect cases there. And a separate small outbreak has also surfaced in the Democratic Republic of the Congo, in central Africa. "We can and we will bring the Ebola epidemic under control," Margaret Chan, director general of WHO, said earlier this week. Yet exactly when and with what resources, by all accounts, remains unanswerable. "This Ebola epidemic is the largest and most severe and most complex we have ever seen in the nearly 40-year history of the disease," she said.

Shortages of everything from medical personnel to protective gloves to beds for patients have riddled the response to this outbreak. Moreover, patients in many communities, either knowing that there are a lack of beds or transport to get them to a care facility or due to distrust of the medical system, have been reluctant to leave their homes—leading to further spread of infection among their families and friends who care for them without proper protective equipment. An additional 980 Ebola treatment center beds are required right now, with 760 of these for Monrovia, Liberia, alone, WHO says. Chan said that foreign medical teams willing and able to deploy to west Africa have also been scant, hindering the response.

The hard-learned lessons from earlier Ebola outbreaks—early case identification, communicating how to protect oneself and tracking all people who may have been exposed—are challenging to apply in this epidemic, which is hobbled by poor health infrastructure, the massive scale of the outbreak and little funding to mount a comprehensive response. If even one person who encountered bodily fluids of an Ebola patient is missed by surveillance, he or she can go on to infect family, friends and medical personnel. WHO has estimated it will take anywhere from six to nine months to contain the outbreak that will likely claim another 20,000 lives.

This week the U.S. Department of Health and Human Services announced it inked a contract with the makers of ZMapp—the experimental Ebola drug administered to a limited number of patients—to support their work. The drug has recently proved successful at treating the virus in monkeys. With the initial contract of $24.9 million over the next 18 months, Mapp Pharmaceutical will manufacture a small amount of the drug for early-stage clinical studies to demonstrate its safety and efficacy in people.

The WHO expert panel that convened on Thursday and Friday considered the outlook for at least another seven potential Ebola therapies beyond ZMapp, but none of the options have yet proved effective at treating Ebola in humans. One option that has already netted U.S. Food and Drug Administration approval for emergency use in Ebola-infected patients, a drug from Tekmira Pharmaceuticals, has a limited stock available now and could have 900 courses ready by early 2015, according to WHO projections. Using so-called small interfering RNA, or siRNA, the drug targets essential viral genes to stop the virus from replicating—at least in monkeys and guinea pigs. Tekmira siRNAs and ZMapp "are both head and shoulders above everything else in terms of demonstrated efficacy in nonhuman primates," says Thomas Geisbert, an expert on Ebola virus at The University of Texas Medical Branch at Galveston who has worked on most of the experimental treatments and vaccines under consideration.

Other experimental options include:

—AVI-7537, a drug designed to block viral protein from being made, has shown human tolerability in early studies and could have 100 courses available by early 2015. It has been shown to help monkeys survive Ebola some 60 to 80 percent of the time.
—Hyperimmune globulin, prepared by purifying and concentrating plasma of immunized animals or previously infected humans with

high titers (concentrations) of neutralizing antibody against Ebola virus, which have been shown to be protective in monkeys but are not currently available and would not be expected before mid-2015.
—Favipivavir, although more than 10,000 treatment doses may be available, this drug approved in Japan for influenza treatment would need to be used at much higher doses than those typically tested for use on the flu. It has been shown to help mice survive, but only one of out six monkeys responded to the tested dosage.
—BioCryst, an antiviral that needs more animal treatment data before it could be considered.
—Interferons, meanwhile, are already commercially available and have been shown to delay time to death in monkeys although they did not increase overall survival. Moreover, it remains unclear which interferon to use, when and at what dosage regimen to yield optimal results.

To date, treatment of Ebola patients has focused on replacing lost electrolytes and monitoring bodily functions and protein deficiencies. Greater action needs to be taken now, Kieny said. More people have died from this outbreak than all prior Ebola outbreaks combined.

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