HEPATITIS C: THE ROLE OF A PHARMACIST AND A CLINICAL PHARMACIST

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Introduction: Hepatitis C is a global health problem as the World Health Organization reported 3-4 million people are newly infected with Hepatitis C virus (HCV) per year and 130-170 million people are chronically infected. In Ukraine over 5% of people are infected with Hepatitis C, in absolute numbers it is more than 2 million people.

Aim: To study the role of a pharmacist and a clinical pharmacist in management of Hepatitis C, investigate pathogenesis and latest approaches to rational treatment and diagnostics of Hepatitis C. **Materials and methods:** We searched Google, Google Scholar and PubMed for relevant scientific articles on the topic and examined national guidelines of Ukraine, Britain, Europe and USA.

Results: Nowadays the conditions, triggered by hepatotropic viruses have a very significant place among other global diseases. Hepatitis C is a liver HCV infection, which in most cases leads to chronic inflammation and severe complications. HCV is a spherical, enveloped, single-stranded RNA virus belonging to the family Flaviviridae, genus *Flavivirus*. It was discovered in 1989 in the U.S. HCV has high mutation ability: there are 6 known genotypes of HCV and each of them has a number of quasitypes. The source and reservoir of infection is an infected person. Infected bodily fluids may also pose a threat. HCV is primarily transmitted through percutaneous exposure to blood. Other modes of transmission include mother-to-infant and contaminated devices shared for non-injection drug use, sexual transmission. The level of contamination is higher in less-developed countries (India 1.5%, Malaysia 2.3%, and the Philipines 2.3%, Ukraine 5%. Alarming rates were reported for many African nations, reaching as high as 14.5% in Egypt). Pathogenesis of Hepatits C is not yet completely understood and is complex. Acute infection often occurs without any symptoms and develops into chronic inflammatory process. It may lead to serious complications, such as fibrosis, cirrhosis, and hepatocellular carcinoma. Symptoms may become evident only in terminal stages. Testing algorythm includes primal HCV antibody test (anti-HCV). A positive test result for anti-HCV indicates either current (active) HCV infection (acute or chronic), past infection that has resolved, or a false-positive test result. Therefore, an HCV nucleic acid test (NAT) is necessary to confirm current (active) HCV infection. Ukrainian national guidelines for HCV infection treatment recommend interferon regimens combined with Ribavirin and Boceprevir. Recommended treatment regimen provides SVR (Sustained virologic response) in 30 to 70% of cases, depending on the HCV genotype and concomitant factors and also has a large number of adverse effects (AEs). Non-interferon regimens with NS5A viral protein inhibitors (Daclatasvir, Paritapevir etc.) are recommended in the U.S. and Europe due to higher SVR rate (up to 99%) and

fewer AEs. In February 2017 U.S. FDA has granted Priority Review to AbbVie for its Investigational Regimen of Glecaprevir/Pibrentasvir (G/P) for the Treatment of Chronic Hepatitis C in All Major Genotypes (GT1-6). High and frequent doses, cost concerns, toxic drug interactions, and AEs create perfect breeding ground for patient nonadherence.

These issues also create a clear role for pharmacists. The management team includes a professional pharmacist, clinical pharmacist and other healthcare professionals in collaboration with the patient, insurance company, and pharmaceutical manufacturer. Pharmacists review patients' clinical history and select the optimal treatment regimen; they also counsel patients on pathology, treatment regimens, AEs, and costs and help eligible patients in obtaining HCV medication through pharmaceutical company–based support programs. Pharmacists are vital for patients' compliance.

Role	**What the Pharmacist Can Do**
Encourage preventive measures	Help patients adhere to immunization schedule for adults because patients with chronic liver disease are at increased risk of contracting other viruses.
Monitor adverse effects and recommend alternative drug regimens	Know each agent's adverse effects and the best ways to deal with them. **Depression is a significant and threatening problem for patients infected with HCV.**
Help prescribers and patients find appropriate and cost-effective therapies	HCV-infected patients can incur, on average, $64,490 in disease-related, out-of-pocket costs over a lifetime, and often more.[3] Treatment costs are serious concerns for most patients and insurers; look for patient assistance programs.
Manage drug toxicity	With treatment discontinuation rates as high as 14% (especially with peginterferon alfa and ribavirin), and new agents available, selecting nontoxic therapy is easier now.
Promote adherence	Adding first-generation direct-acting antivirals can reduce pill burden, duration of treatment, and adverse effects, but increase the likelihood of drug interaction. Pill boxes, alarms, and pocket cards are almost necessities for complex regimens. (Pocket cards are small cards that list drugs, doses, and times).
Refer patients to health providers	Rates of HCV testing and diagnosis are poor, and many patients receive inadequate care following diagnosis. Link HCV-infected patients to providers who deliver comprehensive HCV care.

Conclusions: In summary, it is safe to say, that Hepatitis C is not only a significant global problem, but also a complicated multifactorial disease, which often remains undiagnosed until the late stages. By 2035, HCV-related morbidity and mortality will increase, and experts expect 38,000 cases of end-stage liver disease, 3200 cases requiring referral for liver transplantation, and 36,100 deaths across the US. The Ukrainian standards for HCV infection treatment are inferior to those in the US or Europe in terms of safety and efficacy. Clearly, HCV infection burdens patients' health and wallets, as well as the national economy. Wide enrollment of pharmacists and clinical pharmacists in the treatment process is able to rationalize treatment of Hepatitis C providing medical, social and economic benefits. It's time to employ experience of our foreign colleagues for the good of our society.