Guest Editorial

Acute Pancreatitis; New Methods for Understanding an Old Problem

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Acute pancreatitis is responsible of considerable amount of hospital admissions, and therefore, significant morbidity and mortality in the modern world. The disease poses a significant burden to healthcare systems since its incidence have been rose to as high as 45 subjects in every 100000 population since early 1990s. Excessive alcohol consumption and biliary tract disorders are two most common causes of acute pancreatitis. Other etiological factors include dyslipidemia, surgery or traumatic injury of abdomen, hypercalcemia, infections, inflammation related to vasculitis, tumors of pancreas or ampulla and various drugs. Drugs that cause acute pancreatitis are anti-neoplastic agents (i.e., asparaginase, azathioprine, mercaptopurine), antibiotics (i.e., tetracycline, isoniazid, sulfonamides, metronidazole), anti-inflammatory drugs (i.e., celecoxib, meselamine, leflunomide), thiazide diuretics, anti-diabetic treatments (i.e., exenatide, sitagliptin), and anti-hypertensive and anti-hyperlipidemia therapies (methyl dopa, enalapril, fenofibrate, simvastatin). Medical interventions such as enteroscopy, peritoneal dialysis, endoscopic retrograde colangio-pancreatography, may also induce acute pancreatitis. Cystic fibrosis and pancreas divisum are also contributing conditions to acute pancreatitis.

Pancreatic inflammation is driven by either obstruction or edema of ampulla, early activation of pancreatic enzymes within pancreatic canal or bile reflux to the pancreas, however, exact mechanism of pathogenetic processes remains unclear. Whatever the cause, once the inflammation promotes, auto-digestion of the pancreatic tissue causes severe abdominal pain, nausea, and vomiting. Fever, hypotension and tachycardia may be related with shock in severe cases. Elevated serum lipase and amylase levels, leukocytosis, hyperglycemia, hyperlipidemia, increased liver enzymes and bilirubin levels and urinary findings (casts, proteinuria or glycosuria) are among laboratory findings in patients with acute pancreatitis.

Mainstay of the treatment of acute pancreatitis is withholding oral nutrition, adequate fluid replacement and management of pain by opioids (preferably meperidine). Antibiotics may be given to prevent infected necrotizing pancreatitis although use of antibiotics in this manner is controversial.

Experimental studies have been conducted to find out therapeutic or protective measures to ameliorate pancreatic inflammation in acute pancreatitis. In this issue of National Journal of Health Sciences, Kosekli *et al*. reported that *Nigella Sativa* extract should prevent development of pancreatic necrosis in an experimental acute pancreatitis model [1]. Authors induced necrotizing pancreatitis by taurocholate and applied *nigella sativa* extract before this procedure to the rats in one of the groups. Study results revealed that pancreatic tissue Malondialdehyde, Caspase, Myeloperoxidase, and Tumor necrosis Factor-alpha (TNF-α) levels as well as blood lactate dehydrogenase amylase levels were significantly lower in rats received *nigella sativa* before procedure compared to those did not. Moreover, histopathological pancreatitis scores involving leukocyte infiltration, edema, hemorrhage, fat necrosis and parenchymal necrosis were all lower in rats received pre-procedure *nigella sativa* compared to those did not. This study suggested protective effects of *nigella sativa* against necrotizing acute pancreatitis.

Several other studies in literature reported various drugs and molecules to alleviate severe acute pancreatitis. Sun *et al.* showed that melatonin may prevent acute pancreatitis and intestinal mucosal damage by inhibiting bacterial translocation [2]. In another study, authors reported that adenosine kinase inhibition via intraperitoneal administration of ABT702 (1.5 mg/kg) prevented development of severe acute pancreatitis by inhibiting inflammation and necrosis of acinar cells [3]. Moreover, therapeutic plants, such as Salvia miltiorrhiza (as known as red sage), has been suggested to be useful in treatment and prevention of acute pancreatitis [4]. In addition, recent studies revealed that Pirfenidone, a medication that reduces inflammation by inhibiting synthesis of growth factors and procollagens, improves the course of acute pancreatitis by increasing interleukin-10 levels in murine models [5]. Finally, in an experimental severe acute pancreatitis model in mice showed that galangin, a flavonoid, decreased production of pro-inflammatory cytokines and generation of reactive oxygen species [6]. Studies to prevent or alleviate acute pancreatitis are not limited to those mentioned and large-scale studies continue on this issue.

In conclusion, there are studies on many promising molecules in the prevention and treatment of severe and necrotizing acute pancreatitis, and new studies are continuing on this subject. In addition to the standard acute pancreatitis treatment, it is only a matter of time to develop new approaches that can contribute to the prevention or treatment of the disease.

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CONFLICT OF INTEREST

Declared none.

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REFERENCES

[1] Kosekli M, Ozmen O, Sahinduran S, Yilmaz M. Protective effect of nigella sativa on taurocholate induced pancreatitis in rats. Nat J Health Sci 2021; 6(3): 105-10.

[2] Sun X, Shao Y, Jin Y, *et al*. Melatonin reduces bacterial translocation by preventing damage to the intestinal mucosa in an experimental severe acute pancreatitis rat model. Exp Ther Med 2013; 6(6): 1343-9. DOI: 10.3892/etm.2013.1338.

[3] Sun S, Han Y, Zhang C, *et al*. Adenosine kinase inhibition prevents severe acute pancreatitis via suppressing inflammation and acinar cell necroptosis. Front Cell Dev Biol 2022; 10: 827714. DOI: 10.3389/fcell.2022.827714.

[4] Zhu K, Zhang M, Long J, Zhang S, Luo H. Elucidating the mechanism of action of salvia miltiorrhiza for the treatment of acute pancreatitis based on network pharmacology and molecular docking technology. Comput Math Methods Med 2021; 2021: 8323661. DOI: 10.1155/2021/8323661.

[5] Palathingal Bava E, George J, Tarique M, *et al*. Pirfenidone increases IL-10 and improves acute pancreatitis in multiple clinically relevant murine models. JCI Insight 2022; 7(2): e141108. DOI: 10.1172/jci.insight.141108.

[6] Song YD, Liu YY, Li DJ, *et al*. Galangin ameliorates severe acute pancreatitis in mice by activating the nuclear factor E2-related factor 2/heme oxygenase 1 pathway. Biomed Pharmacother 2021; 144: 112293. DOI: 10.1016/j.biopha.2021.11229

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