

At a glance: Pancreatitis and Obesity

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Acute pancreatitis (AP) is an inflammatory condition of the pancreas, involving tissue injury and necrosis leading to variable degrees of glandular dysfunction. The capricious nature of AP begins at the diverse factors contributing to the development of pancreatitis and extends into the disease process with regards to complications or resolution. The global pooled incidence of AP averages at 34 cases per 100,000 general population per year with no gender differences, however, geographical variability in incidence remains fairly inadequate due to the limited research performed in this area. In 2011, a study done in Japan facilitates in highlighting the emergency that AP presents with a 180% increase over a decade in its diagnosis¹.

The clinical outcome of AP varies considerably depending on the severity of disease at the time of admission, development of complications and/or resolution. The combined average mortality comprising of seven-population based cohorts has shown to be 1.16 per 100,000 general population per year. A ten-year retrospective study in a hospital in Pakistan showed an almost 44% AP patients requiring ICU admission owing to the development of complications at presentation and during the hospital stay leading to a 52% mortality rate in total

with most of the patients at presentation having a BMI of above 30.3 kg/m². The above-mentioned statistics may not be a representation of our demographic owing to lack of sufficient research².

The revised Atlanta classification of 2012 presents a step-wise diagnosis and possible complications depending greatly on whether necrosis has begun in the pancreas or if it is merely an interstitial edematous pancreas. Radiological findings distinguish between an Acute Peri-pancreatic Fluid Collection (APFC) and an Acute Necrotic Collection (ANC) with duration of >4 weeks becoming a Pseudocyst and an area of Walled-Off Necrosis (WON), respectively³.

Establishing the role of obesity in the onset, progression or exacerbation of pancreatitis first warrants the need to understand proposed mechanisms by which it contributes to the pathophysiology of the disease.

The central idea in the pathogenesis of pancreatitis is the increased conversion of trypsinogen to trypsin that causes autolysis of the pancreatic parenchyma. The activation of these pancreatic proteases lies in the chronic state of inflammation that is observed in obesity⁴.

Cytokines produced by adipocytes are maintained as a balance between those that are pro-inflammatory (Leptin and Resistin) and ones that are principally anti-inflammatory (Adiponectin). An excess of adipose tissue predisposes an individual to produce more pro-inflammatory than anti-inflamma-

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tory cytokines, offsetting the balance towards a state of constant inflammation. These pro-inflammatory molecules have been theorized to play a role in the activation of trypsinogen⁴.

Since obesity is also characterized by an increase in fat deposition surrounding the viscera, the fat provides an abundance of substrate for the pancreatic lipases to hydrolyze, thereby causing necrosis which in turn can exacerbate infections that will contribute to the increase in severity of pancreatitis. Microvasculature compromise that often accompanies obesity can also propagate severity by increasing the risk of developing ischemic tissue in the pancreas, aiding the progression of infections and increased morbidity and mortality as a consequence⁵.

Lastly, obese individuals experience restriction in the movement of their chest wall and diaphragm leading to increased respiratory efforts. The decrease in the functional capacity as a result increases the pulmonary arterio-venous shunting causing hypoxemia contributing to decreased tissue oxygenation. This affects the individual in 2 ways; respiratory failure (which remains the most common systemic complication for AP) and an inflammatory response triggered by the lack of oxygenation⁶.

Assessing the role obesity plays in AP can be take a multi-faceted approach based on the many indicators for obesity present. Since there is no one absolute measure to calculate obesity as a risk, research on the subject has been diverse and multi-disciplinary including obesity as a primary indicator for outcomes in AP or a look at the sequelae of obesity and their impact on AP.

Obesity is generally measured as Body Mass Index (BMI) which remains the most popular tool to successfully ascertain the correlation between obesity and the development of Severe Acute Pancreatitis or an increase in mortality in Acute Pancreatitis⁶.

However, stratifying obesity as BMI, Subcutaneous Adipose Tissue (SAT), Visceral Adipose Tissue (VAT) and Visceral fat-to-Muscle Ratio (VMR)

would indicate that of all four measures, VMR had the strongest correlation with the severity of AP⁷.

Similarly, a study comparing total body adiposity (as indicated by the BMI) and abdominal adiposity (as indicated by the waist circumference) would indicate the latter to be a better indicator of predicting outcomes in AP⁷⁻⁸.

Intra-pancreatic fat, known to increase in obesity, also appears to have a significant role in the development and worsening of AP opening a vista of molecular changes hit her to unknown.

Hyper triglyceridemia induced Pancreatitis can also find an association to obesity in patients that present with Metabolic Syndrome, thereby expounding the affect obesity control might have on the prevalence of AP⁸.

Working along the line of inflammation, the occurrence of Fatty Liver in patients with AP has been shown the worsen the prognosis of AP due to the increased function of Kuppfer Cells in hepatic tissues which release inflammatory mediators, exacerbating the symptoms and subsequently the outcome of AP.

A cursory look at existing research and the paucity of it in the Pakistani demographic calls to attention the potential for work that can be done to improve the assessment, management and eventual outcome for Acute Pancreatitis. Establishing the role obesity plays here would increase efforts for there might be the possibility of primary prevention of disease that has been widely known to be unpredictable.

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