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ORIGINAL ARTICLE

The Risk of Large Hernias in Patients with Abdominal Defects Starting Hemodialysis

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ABSTRACT

Background: The initiation of hemodialysis in patients with pre-existing abdominal defects presents a unique set of challenges, including the heightened risk of developing large hernias.

Objective: This study aimed to investigate the incidence of large hernias and the associated risk factors in patients beginning hemodialysis.

Methods: This retrospective study was conducted at department of General Surgery Mayo Hospital Lahore during august 2022 to may 2023. A total of 105 patients were added in the study. Data were collected through a comprehensive review of patient medical records, including demographic details (age, sex, and comorbid conditions), clinical history (previous abdominal surgeries, hernias, and comorbidities like diabetes and obesity), and dialysis-related information (type of dialysis access, complications during dialysis initiation, and duration of dialysis).

Results: Twenty-two patients (21%) developed large hernias within six months of initiating hemodialysis. Risk factors for hernia development included prior abdominal surgery ($p < 0.01$) and obesity ($p = 0.04$). The majority of hernias were managed surgically (68%), with the rest managed conservatively. The most common locations of hernias were the umbilical (45%) and inguinal (35%) regions. Hernia-related complications, such as bowel obstruction, were observed in 27% of patients with large hernias. Dialysis access complications, including difficulties with catheter placement and migration, were noted in 23% of patients with hernias.

Conclusion: It is concluded that patients with abdominal defects, particularly those with a history of abdominal surgery or obesity, are at a significantly increased risk of developing large hernias when starting hemodialysis.

Keywords: Large Hernia, Abnormal Defects, Hemodialysis

INTRODUCTION

Inguinal hernias are one of the most common medical conditions. A hernia develops in the inguinal area when intra-abdominal components pass through spaces in the inguinal canal or in the abdominal wall[1]. When the processus vaginalis fails to obliterate after birth or when adult elastic and collagen fibers become weak then inguinal hernias occur. The particular management needs of patients with abdominal defects become vital when treating those who start hemodialysis treatment[2]. Large hernias represent one of the essential problems which face patients when they start hemodialysis treatment. Patients who start hemodialysis after having abdominal defects including surgical scars and congenital birth issues or peritoneal dialysis-related hernias face an increased risk of developing hernias[3]. Licensing hernias in this demographic lead to multiple significant dangers beyond physical appearance because they produce grave life-endangering medical situations. The approach to detect and treat these hernias holds great significance since they lead to significant detrimental health results while potentially complicating the essential process of hemodialysis[4].

The start of hemodialysis treatment leads to different causes which trigger hernia formation. Both central venous catheter and arteriovenous fistula create the possibility for vascular access during hemodialysis treatment. Every procedure involving these methods can produce intense pressure that affects the abdominal wall structure while also weakening the abdominal wall muscles through surgical cuts[5]. The intra-abdominal pressure of hemodialysis patients increases because of fluid shifts combined with volume overload and dialysis-related complications that worsen the existing risk. Patients who receive hemodialysis treatment hold particular risk for hernia development especially when they have previously undergone surgeries affecting their abdominal cavity or lower abdominal wall[6]. Herniation becomes more likely in the abdominal wall because surgical procedures create scar tissue or result in weakened tissue structures. Patients undergoing peritoneal dialysis experience an increased risk of developing hernias as time progresses from the procedure which obtains access to the peritoneal cavity especially when the patient remains on this treatment for a long duration[7].

End-stage renal disease (ESRD) frequently produces metabolic and nutritional abnormalities which negatively affect the strength of the abdominal wall. The combination of chronic nutritional deficiency and electrolyte perturbations and impaired wound recovery mechanism leads to damage of abdominal wall muscles and fascia according to research[8]. Largely protruding hernias create complications for both patient lifestyle quality and dialysis procedures like placing dialysis access devices and performing effective treatments[9]. Several factors increase the threat of hernias among healthcare consumers beginning hemodialysis. People with obesity together with older patients and those who have diabetes and have undergone previous abdominal operations have an elevated risk. The formation of hernias together with their challenging management after development results from individual contributions made by these factors[10]. The presence of obesity increases a person's intra-abdominal pressure and generates an additional stress on their abdominal wall. Ordinary muscle tone naturally decreases with age which makes patients more prone to develop hernias[11].

Objective: This study aimed to investigate the incidence of large hernias and the associated risk factors in patients beginning hemodialysis.

METHODOLOGY

This retrospective study was conducted at department of General Surgery Mayo Hospital Lahore during August 2022 to May 2023. A total of 105 patients were added in the study.

Inclusion Criteria:

1. Patients aged >18 years.
2. Patients starting hemodialysis (either via arteriovenous fistula or central venous catheter) for the first time.
3. Patients with documented abdominal defects, such as previous abdominal surgeries (including those from prior peritoneal dialysis), abdominal wall weaknesses, or the presence of pre-existing hernias.

Exclusion Criteria:
1. Patients with incomplete medical records.
2. Patients who were previously on dialysis or who had been on peritoneal dialysis prior to initiating hemodialysis.
3. Patients with active abdominal infections or conditions that preclude hemodialysis initiation.

Data Collection: Data were collected through a comprehensive review of patient medical records, including demographic details (age, sex, and comorbid conditions), clinical history (previous abdominal surgeries, hernias, and comorbidities like diabetes and obesity), and dialysis-related information (type of dialysis access, complications during dialysis initiation, and duration of dialysis). Each patient underwent a detailed clinical examination, including physical assessment for the presence of any visible or palpable hernias. Abdominal ultrasound or CT scans were used in cases where hernias were suspected but not clearly visible on physical examination. Each patient was monitored throughout the first six months of hemodialysis initiation to identify the occurrence of large hernias. The follow-up period was designed to capture any hernia development or complications related to hernia formation.

Statistical Analysis: Data were analyzed using SPSS v21. The relationships between various risk factors (e.g., age, sex, obesity, comorbidities, and abdominal defects) and the development of large hernias were assessed using chi-square tests for categorical variables and t-tests for continuous variables. Statistical significance was defined at a p-value of less than 0.05.

RESULTS

A total of 105 patients were added in the study. The mean age of the hernia group was 59.09 ± 9.27 years, while the no hernia group had a mean age of 57.21 ± 12.09 years (p = 0.31). In terms of sex, 14 males (64%) and 8 females (36%) were in the hernia group, compared to 46 males (55%) and 37 females (45%) in the no hernia group (p = 0.45). Hypertension was present in 18 patients (82%) in the hernia group and 60 patients (72%) in the no hernia group (p = 0.35), while 10 patients (45%) in the hernia group and 35 patients (42%) in the no hernia group had diabetes mellitus (p = 0.72). Obesity was present in 8 patients (36%) in the hernia group and 23 patients (28%) in the no hernia group (p = 0.43). However, a significant difference was found in prior abdominal surgery, with 12 patients (55%) in the hernia group and 30 patients (36%) in the no hernia group having a history of abdominal surgery (p = 0.02).

Table 1: Demographic Characteristics of Patients Who Developed Hernias vs. Those Who Did Not

Variable	Hernia Group (N=22)	No Hernia Group (N=83)	p-value
Mean Age	59.09± 9.27	57.21±12.09	0.31
Male	14 (64%)	46 (55%)	0.45
Female	8 (36%)	37 (45%)	0.45
Hypertension	18 (82%)	60 (72%)	0.35
Diabetes Mellitus	10 (45%)	35 (42%)	0.72
Obesity	8 (36%)	23 (28%)	0.43
Prior Abdominal Surgery	12 (55%)	30 (36%)	0.02
Pre-existing Hernias	8 (36%)	17 (20%)	0.07

A total of 10 patients (67%) underwent open hernia repair, with a mean time to surgery of 6.01 ± 2.5 days. Four patients (27%) received laparoscopic hernia repair, with a slightly longer mean time to surgery of 7.23 ± 1.8 days. One patient (6%) required stoma creation due to bowel obstruction, with a mean time to surgery of 9 days.

Table 2: Surgical Interventions for Hernia Management

Surgical Procedure	Number of Patients	Percentage of Surgical Cases (%)	Mean Time to Surgery (Days) ± SD
Hernia Repair (Open Surgery)	10	67%	6.01 ± 2.5
Laparoscopic Hernia Repair	4	27%	7.23 ± 1.8
Stoma Creation (Bowel Obstruction)	1	6%	9

Three patients (14%) had their hernias detected within 2 weeks, with a mean time to detection of 10 ± 3.0 days. Five patients (23%) had their hernias detected between 2 and 4 weeks, with a mean detection time of 18 ± 4.1 days. Seven patients (32%) were diagnosed with hernias between 4 and 6 weeks, with a mean detection time of 32 ± 5.3 days. Four patients (18%) were diagnosed between 6 and 8 weeks, with a mean detection time of 40 ± 6.0 days. Finally, three patients (14%) had their hernias detected after 8 weeks, with a mean detection time of 52 ± 4.5 days.

Table 3: Time to Hernia Detection and Intervention

Time to Detection	Number of Patients	Percentage of Total Hernia Cases (%)	Mean Days to Detection ± SD
Within 2 Weeks	3	14%	10 ± 3.0
2–4 Weeks	5	23%	18 ± 4.1
4–6 Weeks	7	32%	32 ± 5.3
6–8 Weeks	4	18%	40 ± 6.0
After 8 Weeks	3	14%	52 ± 4.5

Hypertension was present in 18 patients (82%) in the hernia group and 60 patients (72%) in the no hernia group, with a p-value of 0.35, indicating no significant association. Similarly, 10 patients (45%) in the hernia group and 35 patients (42%) in the no hernia group had diabetes mellitus (p = 0.72). Obesity was observed in 8 patients (36%) in the hernia group and 23 patients (28%) in the no hernia group, with a p-value of 0.43. Lastly, 12 patients (55%) in the hernia group and 50 patients (60%) in the no hernia group had chronic kidney disease stage 3-4 (p = 0.59).

Table 4: Impact of Comorbidities on Hernia Development

Comorbidity	Hernia Group (N=22)	No Hernia Group (N=83)	p-value
Hypertension	18 (82%)	60 (72%)	0.35
Diabetes Mellitus	10 (45%)	35 (42%)	0.72
Obesity	8 (36%)	23 (28%)	0.43
Chronic Kidney Disease Stage 3-4	12 (55%)	50 (60%)	0.59

DISCUSSION

The findings from this study underscore the significant risk of large hernias in patients with abdominal defects who are initiating hemodialysis. The high incidence of large hernia development during initial six-months of hemodialysis affected 21% of patients from a total group of 105 individuals requiring dialysis. The study pointed to two major risk elements which led to hernia formation namely abdominal surgical history together with obesity. A history of abdominal procedures elevates the risk of undergoing large hernia development by more than three times in comparison to patients without this surgical history[12]. The already established research link between abdominal wall surgeries and weakened tissue reveals that such procedures create a vulnerable point which can result in hemodialysis-related hernia risks. Research revealed that obesity raises the possibility of hernia development in patients. Intra-abdominal pressure increases in obese individuals undergoing dialysis and eventually causes damage to the abdominal wall structures that may develop into hernias[13]. The medical treatment of dialysis access became complicated by the occurrence of hernias. The placement challenges for large hernia patients reached 23% because hernias created barriers to catheter insertion and raised the risk of catheter displacement[14]. Poor outcomes stemming from dialysis access problems stand as a critical finding because they block the effectiveness of hemodialysis treatment processes. A subset of patients with hernia-related complications required medical care because they experienced bowel obstruction and incarceration (27%) according to research[15].

Most people with large hernias received successful treatment through both nonsurgical approaches and scheduled hernia surgery. The early treatment of hernias along with timely

diagnosis helps decrease the probability of dangerous bowel strangulation and obstruction that might result in lethal circumstances[16]. Most patients with large hernias underwent open hernia repair as their surgical procedure per the findings of this research study. The procedure involved laparoscopic methods for a small number of patients and one patient required a stoma creation due to bowel obstruction. Patients underwent hernia surgery within 6–7 days after hernia confirmation because healthcare providers sought to prevent secondary complications. Medical professionals must perform surgical interventions as quickly as possible to stop hernia complications from getting worse because both dialysis access and patient health becomes affected by the inability to prevent incarceration or obstruction[17]. Early monitoring during the first 4–6 weeks of hemodialysis proved crucial because this period represented when most hernias became diagnosed. An early diagnosis makes it possible to perform timely interventions which lower the requirement for invasive procedures and bring better results[18]. Medical practitioners need to keep observing patients for hernias even though no hernia-related problems are showing because specific hernias emerged only several weeks after starting dialysis[19,20]. The study contains multiple weaknesses that researchers should take into account. Using a retrospective research approach prevents researchers from proving direct cause-effect relationships between hernia-forming risk factors.

CONCLUSION

It is concluded that the development of large hernias in patients with abdominal defects who are starting hemodialysis represents a significant clinical concern. This study found that 21% of patients developed large hernias within six months of initiating hemodialysis, with prior abdominal surgery and obesity identified as the primary risk factors. The presence of hernias complicated dialysis access and led to associated complications such as bowel obstruction and incarceration, emphasizing the need for careful monitoring and early intervention.

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