



Mesh repair of paraumbilical hernia, outcome of 58 cases

Deari Ahmed Ismaeil

University of Sulaimani, College of Medicine, Sulaimani, Iraq



ARTICLE INFO

Keywords:

Para umbilical hernia
Size
Mesh repair

ABSTRACT

Background: According to the literature, defects in para-umbilical hernias up to 2 cm in diameter could be sutured primarily. For defects larger than 2 cm in diameters, mesh repair is recommended. The aim of this study is to evaluate the outcome of para-umbilical hernia repair with proline mesh regardless of its size.

Methods: In this retrospective study, patients with para-umbilical hernia, who were managed by onlay mesh placement were presented, and followed for 1–6 years. Several variables were studied including patients' socio-demographic data, post-operative complications, morbidity and mortality.

Results: The series includes 58 patients, the age ranged from 18 to 85 years with median age of 44 years and inter-quartile range of 13.5 years. Mean body mass index was (30.9 ± 4.2) . From 49 female patients; 43 (87.8%) were multipara. Forty seven cases (81%) presented for the first time, and 11 cases (19%) had recurrent hernias. Twenty patients (34.5%) had hernia defect ≤ 2 cm, while 38 patients (65.5%) had hernia size > 2 cm. Superficial surgical site infection was found in 6 patients (10.34%). Seroma was found in one female patient (1.72%). One patient (1.72%) had recurrent hernia after 19 months.

Conclusion: Mesh onlay repair by open surgery can be applied to all sizes of para umbilical hernias, it has low recurrence rate and the rates of morbidity and recurrence are comparable with international standard.

1. Introduction

Para-umbilical hernia (PUH) results through a defect in the linea alba. It is a common surgical problem consisting of 10% of all primary hernia [1–3]. They are more common in parous, obese, middle aged and elderly women [4]. Obesity and multiparity are important predisposing factors not only for primary, but also for recurrent cases [5,6].

The content of the hernia sac might be preperitoneal fat tissue, omentum, and small intestine in the majority; sometimes a combination of those organs may be present [7]. Pain is the most common indication to visit a physician [8]. Elective surgery is a treatment of choice due to recognized risk of obstruction, incarceration and strangulation [4].

In the past, these hernias were treated by tension free suture which resulted in a high rate of recurrence and this led to the reduction in its popularity. The use of mesh to repair the hernia defect either open or laparoscopic is widely used now a day [9,10]. A tension free mesh technique has drastically reduced the recurrence rates for all kinds of hernia compared to tissue repair [11–13].

Several factors have been implicated for recurrence after PUH repair; large seroma and surgical site infection are classical complications that may result in recurrence. Obesity and excessive weight gain following repair are other factors [6,14,15].

Size of the hernia defect interferes with the type of the operation and many surgeons still make their decisions on the basis of the size of

the PUH defect, and it still a matter of controversy; a postal questionnaire study from Scotland revealed that surgeons preferred mesh repair for defects > 5 cm, whereas similar preference rates for suture and mesh repairs were obtained for defects < 2 cm [16].

The mesh can be placed via both the open and laparoscopic approaches, and some authors believe that laparoscopy is preferred in just a quarter of the cases [17,18]. Mesh can be applied onlay; on the anterior fascia, inlay; in the hernia defect, sublay; to retro-rectus or preperitoneal space or underlay; in the intra-peritoneal position [19].

Open onlay mesh placement is the easiest technique; however, it requires subcutaneous dissection that may cause seroma or haematoma and superficial surgical site infection (SSSI) in some cases [20–22], that is to be said, onlay repair has low recurrence rate, with minimum complications in case of PUH [23]. Inlay repair it is technically easier and it is also vulnerable to superficial wound complications. Sublay repair is often considered more challenging and complex to perform. Underlay repair, while it protects from superficial wound complications, the mesh is exposed to intra-peritoneal contents [24–27]. The aim of this study is to confirm the effectiveness and outcome of para-umbilical hernia repair with proline mesh regardless of its size.

E-mail address: deari.ismaeil@univsul.edu.iq.

<https://doi.org/10.1016/j.amsu.2018.04.028>

Received 14 September 2017; Received in revised form 20 March 2018; Accepted 9 April 2018

2049-0801/ © 2018 The Author. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

2. Patients and methods

2.1. Study design and setting

A retrospective multicenter study of 58 patients, were presented with PUH of different sizes, and treated by onlay placement Synthetic polypropylene mesh, from 2010 to 2016, and followed for 19 months to 6 years. The study protocol was approved by the local ethical committee in Sulaimani medical college.

Demographic data (age, gender and residency), body mass index (BMI) were recorded. All patients were operated under general anesthesia, in supine position, with a transverse skin incision over the bulge near the umbilicus. With blunt and sharp dissection, the rectus sheath was cleared of fatty tissues and the defect containing the hernia contents was identified. The defect was opened along with sac. The sacs were separated and contents were reduced into the abdominal cavity. The hernia sacs were excised and the peritoneum was left un-sutured. A non-absorbable suture (0 or 1 Nylon or Prolene) was used to close the defect in the linea alba and a proline mesh of adequate size was applied on the fascia and fixed with few non-absorbable stitches (2/0 proline). Haemostasis was secured and wound was closed over a redivac drain placed in the subcutaneous place (for 5–7 days). Incarcerated and strangulated hernias were excluded.

A prophylactic antibiotic (1 gm intravenous Cefotaxime) was used for 24 h on each patient.

Post-operative instructions were given to all patients including early wearing of an abdominal belt for two months, avoiding lifting heavy weights for four months, and not being pregnant for one year. The patients were followed every two months initially in the private clinic, for 6 months and then every six months, until 2 years, and later on by phone call annually. The work has been reported in line with the PROCESS criteria [28].

2.2. Statistical analysis

After data collection and prior to data entry and analysis, the questions of study were coded. Data entry performed on excel spreadsheet then the statistical analysis was performed by Statistical Package for the Social Sciences (SPSS) program, version 21.

The data presented in tabular form showing the frequency and relative frequency distribution of different variables of the study.

P values of 0.05 were used as a cut off point for significance of statistical tests.

3. Results

The study included 58 patients, age ranged between 18 and 85 years, with mean age of (45.1 ± 13.6) years. The peak incidence was between 18 and 44 years (51.7%). Forty nine (84.5%) cases were female and 9 (15.5%) cases were male (P value: < 0.001).

The predisposing factors, like obesity: 4 patients (6.9%) had normal BMI, 26 patients (44.8%) were overweight, 28 patients (48.3%) were obese, with mean BMI of (30.9 ± 4.2), and (P value: < 0.001).

Parity was also found to be a predisposing factor; from 49 female patients; 43 (87.8%) were multiparous and 6 (12.2%) were not multiparous (P value: < 0.001). But there was no real factor relating to lifting of heavy weights; from 58 patients; 51 (87.9%) had usual work, and 7 (12.1%) had strenuous duties like workers and porter (Table 1).

Forty seven cases (81%) presented for first time, and 11 cases (19%) had recurrent hernia; all of these cases had been repaired by simple suturing or Mayo repair, without mesh. Twenty patients (34.5%) had hernia defect of ≤ 2 cm, while 38 patients (65.5%) had hernial size > 2 cm. The patients followed up for at least 2 years: 23 patients (39.7%) for up to 2 years, 22 patients (37.9%) for up to 4 years, and 13 patients (22.4%) for up to 6 years. Postoperative complications including superficial surgical site infection (SSSI) and seroma were found in 8

Table 1
Distribution of patient demographics and predisposing factors.

Variable		Frequency	Percentage	P value
Gender	Male	9	15.5%	< 0.001
	Female	49	84.5%	
Age	18 - 44 years	30	51.7%	0.2
	45 - 60 Years	20	34.5%	
	> 60 years	8	13.8%	
Parity	Multipara	43	87.8%	< 0.001
	Non-Multipara	6	12.2%	
BMI	Normal	4	6.9%	< 0.001
	Overweight	26	44.8%	
	Obese	28	48.3%	
Occupation	Hard work	7	12.1%	< 0.001
	Non- Hard work	51	87.9%	

Table 2
Distribution of superficial surgical site infection (SSSI) and seroma.

Variable		SSSI		P value	Seroma		P value
		No	Yes		No	Yes	
Gender	Male	8	1	0.66	9	0	0.67
	Female	44	5		48	1	
Age	18 - 44 years	27	3	0.98	30	0	0.38
	45 - 60 Years	18	2		19	1	
	> 60 years	7	1		8	0	
Parity	Multipara	37	6	0.33	42	1	0.71
	Non- Multipara	6	0		6	0	
Obesity	Normal	4	0	0.57	4	0	0.54
	Overweight	24	2		25	1	
	Obese	24	4		28	0	
Occupation	Hard work	7	0	0.45	7	0	0.71
	Non- Hard work	45	6		50	1	
Size of defect	≤ 2 cm	18	2	0.54	20	0	0.46
	> 2 cm	34	4		37	1	

patients (13.79%); 7 females and 1 male, with no significant P value (0.8), regardless of the age, parity, BMI, occupation, size of the hernia and whether it was the first operation, or recurrent (Table 2). Seroma was found in one female (1.72%). One female patient (1.72%) had recurrent hernia after 19 months; she was overweight with defect > 2 cm (see Tables 3 and 4).

4. Discussion

In general, PUHs are more common in women than men [20], in our study, also female patients were more affected (84.5% and 15.5%) with P value of (< 0.001). It is believed that adipose deposition differs between genders and this contributes to gender difference in hernia formation [29].

In a study conducted by Daudpoto and associates, they found that majority of patients were above the age of 40 years [23] and in another

Table 3
Comparison between the two groups (defect < 2 cm and ≥ 2 cm) regarding Wound infection, seroma and recurrence.

Complications		Size of defect		P value
		≤ 2 cm	> 2 cm	
Wound infection	Yes	2	4	0.95
	No	18	34	
Seroma	Yes	0	1	0.46
	No	20	37	
Recurrence	Yes	0	1	0.46
	No	20	37	

Table 4
Comparison between recurrent and non-recurrent patients regarding wound infection and seroma.

Complications		Operation		P value
		First time	Recurrent	
Wound infection	Yes	4	2	0.34
	No	43	9	
Seroma	Yes	1	0	0.63
	No	46	11	
Recurrence	Yes	1	0	0.63
	No	46	11	

study the mean age was (42.7, SD 12) [30], in this study the mean age was (45.1 ± 13.6) years and the peak incidence was between 18 and 44 years (51.7%).

Obesity and multiparity are regarded as predisposing factors [5,23,31,32], also in the current study obesity and multiparity were prevalent; (44.8%) of the patients were overweight, (48.3%) were obese, with mean BMI of (30.9 ± 4.2), and (P value: < 0.001), and from 49 female patients; 43 (87.8%) were multiparous and 6 (12.2%) were not multiparous. (P-value: < 0.001).

Although physical strain regarded as an aetiological factors in the development of PUH which raises intra-abdominal pressure, like powerful muscular effort [33], but we found that (87.9%) had usual work, and only (12.1%) had strenuous duties.

In Abdul Qayoom and his colleague study [23]; they classified the size of the hernia defects to 2–4 cm which were found in (63–78%) of the cases, and 4–6 cm which were found in (21–36%). Wassenberg et al. classified the hernia defects to small size (1–2 cm) which were found in (62.5%), and medium defects (2–4 cm) which were found in (37.5%) [34]. The hernia defects were classified using the classification proposed by the European Hernia Society, in which small hernias had diameters < 2 cm, medium size hernias had diameters between 2 and 4 cm and large hernias had diameters > 4 cm [35]. In this study we divided them to ≤ 2 cm as small size, which were found in (34.5%) of patients, and > 2 cm as large size and found in (65.5%) of the patients.

The use of mesh in umbilical hernia repair results in decreased recurrence and similar wound complications rates compared to tissue repair for primary umbilical hernias [9]. Onlay mesh repair by open surgery is simple, safe and effective with acceptable recurrence rate and a short learning curve [22,23,36]. Complications of this type of surgery include: wound infection, seroma and pain at the site of the operation [14,15]. These complications were found in (13.79%) in this series, regardless of the technique used, the risk of mesh infection remains a serious problem. The incidence of mesh infection in open surgery found to be relatively high (6%–10%) [37,38], because of being superficial. In the study done by Arroyo et al., rates of early complications such as seroma, haematoma or wound infection were similar in both simple suturing and mesh repair [38]. There was no mesh infection in this series, but SSSI found in six patients (10.34%), and there was no significant difference regarding different varieties, it is comparable to (11.11%) reported by Qayoom et al. (2013) [23], and somewhat similar to Rajsid dharth, Bantu, et al. study (13.33%) [40], Malik et al. (8.14%) [41], and Wassenberg (8.3%) [34]. These patients were treated with regular dressing and appropriate antibiotics, and no patient required removal of the mesh, because the infection was superficial and responded well to the treatment.

Seroma formation may complicate onlay technique. These may be explained by the fact that onlay techniques require subcutaneous dissection to place the mesh, which lead to devitalization of the tissue, and it happened in one female patient (1.72%) in this series, which nearly similar to 2.71% in Abdul Qayoom et al. (2013) [23], and less than 5% in Bessa et al. (2015) [42]. Chronic pain was not found in this series.

Clinical trials revealed that the recurrence rate was lower after mesh repair than that after suture repair (1% vs. 11%) in a 64-month mean postoperative follow-up [39]. Also in a retrospective clinical series of 100 patients, the recurrence rates for the suture and mesh repair groups were 11.5% and 0%, respectively (p = 0.007), with similar results in the infection rate in favor of mesh repair [36]. In this series, one patient had recurrent hernia after 19 months; she was overweight with defect > 2 cm, with recurrence rate of (1.72%), the rate of recurrence in this series was less to 2.7% reported by Qayoom et al (2013) [23], 3.4% rate reported by Kingsnorth et al. in UK17 shows recurrence in mesh onlay repair [43], 4.1% rate reported by Wassenberg, Dirk, et al. [34], and 10% reported by Kensarahet al (2011) [30]. There are several limitations regarding this study. First, the study design is poor regarding question has been addressed. Second, the sample size is small. Lastly, the data collection (retrospective) is a cause of missing data.

5. Conclusion

Onlay mesh repair is a simple, safe and effective. It can be applied to all size of para umbilical hernias with low recurrence rate. Morbidity, infection and recurrence are comparable international standard.

Ethical permission

A written consent was obtained from scientific and ethical committee of University of Sulaimani, number 18 at February 2, 2017.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Author contribution

Deari Ahmed Qasab: Surgeon performed the operation, follow up and drafting the manuscript.

Conflicts of interest

The authors declare no conflict of interest in preparing this article.

Research registration number

Researchregistry: 2739.

Consent

Written/verbal consent was obtained from the patients or patients' parent/carer.

Guarantor

Deari Ahmed Qasab.

References

- [1] U. Klinge, A. Prescher, B. Klosterhalfen, V. Schumpelick, Entstehung und Pathophysiologie der Bauchwanddefekte, *Chirurg* 68.4 (1997) 293–303.
- [2] H. Ellis, C. Watson, Hernia, Lecture Notes of Surgery, tenth ed., Blackwell publishing company, U.S.A, 2002, pp. 231–241.
- [3] Norman Williams, P. Ronan O'Connell, Bailey & Love's Short Practice of Surgery 26E, Crc Press, 2013, p. 962.
- [4] Margaret Farquharson, James Hollingshead, Brendan Moran (Eds.), Farquharson's Textbook of Operative General Surgery, CRC Press, 2014, p. 222.
- [5] H. Kulaçoğlu, Current options in umbilical hernia repair in adult patients, *Turk. J. Surg.* 31 (3) (2015) 157.
- [6] Linas Venclauskas, Mindaugas Kiudelis Jolita Šilanskaitė, Umbilical hernia: factors indicative of recurrence, *Medicina* 44 (2008) 855–859.

- [7] J.J. Martis, K.V. Rajeshwara, M.K. Shridhar, D. Janardhanan, S. Sudarshan, Strangulated Richter's umbilical hernia-a case report, *Indian J. Surg.* 73 (6) (2011) 455–457 2011.
- [8] C.A. Courtney, A.C. Lee, C. Wilson, P.J. O'Dwyer, Ventral hernia repair: a study of current practice, *Hernia* 7 (1) (2003) 44–46.
- [9] N. Aslani, C.J. Brown, Does mesh offer an advantage over tissue in the open repair of umbilical hernias? A systematic review and meta-analysis, *Hernia* 14 (5) (2010) 455–462.
- [10] H. Gray Stephen, Mary T. Hawn, Kamal MF. Itani, Surgical progress in inguinal and ventral incisional hernia repair, *Surg. Clin.* 88 (1) (2008) 17–26.
- [11] William S. Cobb, Kent W. Kercher, B. Todd Heniford, The argument for lightweight polypropylene mesh in hernia repair, *Surg. Innovat.* 12 (1) (2005) 63–69.
- [12] Roland W. Luijendijk, A comparison of suture repair with mesh repair for incisional hernia, *N. Engl. J. Med.* 343 (6) (2000) 392–398.
- [13] Jacobus WA. Burger, Long-term follow-up of a randomized controlled trial of suture versus mesh repair of incisional hernia, *Ann. Surg.* 240 (4) (2004) 578–583.
- [14] Mylan T. Nguyen, Comparison of outcomes of synthetic mesh vs suture repair of elective primary ventral herniorrhaphy: a systematic review and meta-analysis, *JAMA Surg.* 149 (5) (2014) 415–441.
- [15] Rachel L. Berger, Suture versus preperitoneal polypropylene mesh for elective umbilical hernia repairs, *J. Surg. Res.* 192 (2) (2014) 426–431.
- [16] P. Witherspoon, P.J. O'Dwyer, Surgeon perspectives on options for ventral abdominal wall hernia repair: results of a postal questionnaire, *Hernia* 9 (3) (2005) 259–262.
- [17] J. Dalenbäck, C. Andersson, D. Ribokas, G. Rimback, Long-term follow-up after elective adult umbilical hernia repair: low recurrence rates also after non-mesh repairs, *Hernia* 17 (4) (2013) 493–497.
- [18] M. Funk, Luke, K.A. Perry, V.K. Narula, D.J. Mikami, W.S. Melvin, Current national practice patterns for inpatient management of ventral abdominal wall hernia in the United States, *Surg. Endosc.* 27 (11) (2013) 4104–4112.
- [19] Julie L. Holihan, Duyen H. Nguyen, Mylan T. Nguyen, et al., Mesh location in open ventral hernia repair: a systematic review and network meta-analysis, *World J. Surg.* 40 (1) (2016) 89–99.
- [20] H. Kulacoglu, D. Yazicioglu, I. Ozyaylali, Prosthetic repair of umbilical hernias in adults with local anesthesia in a day-case setting: a comprehensive report from a specialized hernia center, *Hernia* 16 (2) (2012) 163–170.
- [21] M. Kurzer, P.A. Belsham, A.E. Kark, Tension-free mesh repair of umbilical hernia as a day case using local anaesthesia, *Hernia* 8 (2) (2004) 104–107.
- [22] Rachel L. Berger, et al., Development and validation of a risk-stratification score for surgical site occurrence and surgical site infection after open ventral hernia repair, *J. Am. Coll. Surg.* 217 (6) (2013) 974–982.
- [23] Daudpoto Abdul Qayoom, Shahid Mirani, Rafique Ahmed Memon, Qarib Abbas, A long term follow up: mesh versus Myo's repair in paraumbilical hernia, *JUMDC* 4 (1) (2013) 12–16.
- [24] Christopher W. Snyder, Effect of mesh type and position on subsequent abdominal operations after incisional hernia repair, *J. Am. Coll. Surg.* 212 (4) (2011) 496–502.
- [25] Yuri W. Novitsky, Comparative evaluation of adhesion formation, strength of ingrowth, and textile properties of prosthetic meshes after long-term intra-abdominal implantation in a rabbit, *J. Surg. Res.* 140 (1) (2007) 6–11.
- [26] T.N. Robinson, Major mesh-related complications following hernia repair, *Surgical Endoscopy and Other Interventional Techniques* 19 (12) (2005) 1556–1560.
- [27] J. Losanoff, B. Richman, J. Jones, Entero-colocutaneous fistula: a late consequence of polypropylene mesh abdominal wall repair: case report and review of the literature, *Hernia* 6 (3) (2002) 144–147.
- [28] Riaz A. Agha, Alexander J. Fowler, Shivanchan Rajmohan, Ishani Barai, P. Dennis, Orgill for the Process Group. Preferred reporting of case series in surgery; the PROCESS guidelines, *Int. J. Surg.* 36 (Pt. A) (2016) 319–323.
- [29] B. Geer Eliza, Wei Shen, Gender differences in insulin resistance, body composition, and energy balance, *Gend. Med.* 6 (2009) 60–75.
- [30] Ahmed M. Kensarah, A long-term follow-up: suture versus mesh repair for adult umbilical hernia in Saudi patients. A single center prospective study, *Surg. Sci.* 20 (3) (2011) 155.
- [31] Mohamed Sukeik, Alkari Bassam, Basil J. Ammori, Abdominal wall hernia during laparoscopic gastric bypass: a serious consideration, *Obes. Surg.* 17 (6) (2007) 839–842.
- [32] G. Birgisson, Obesity and laparoscopic repair of ventral hernias, *Surg. Endosc.* 15 (12) (2001) 1419–1422.
- [33] Williams Norman, P. Ronan O'Connell, Bailey & Love's Short Practice of Surgery 26E, Crc Press, 2013, p. 962.
- [34] Dirk Wassenberg, Closure of small and medium size umbilical hernias with the Proceed Ventral Patch in obese patients: a single center experience, *SpringerPlus* 3 (1) (2014) 686.
- [35] F.E. Muysoms, Classification of primary and incisional abdominal wall hernias, *Hernia* 13 (4) (2009) 407–414.
- [36] P. Sanjay, T.D. Reid, E.L. Davies, P.J. Arumugam, A. Woodward, Retrospective comparison of mesh and sutured repair for adult umbilical hernias, *Hernia* 9 (4) (2005) 248–251.
- [37] William S. Cobb, Infection risk of open placement of intraperitoneal composite mesh, *Am. Surg.* 75 (9) (2009) 762–768.
- [38] Sven Petersen, Deep prosthesis infection in incisional hernia repair: predictive factors and clinical outcome, *Eur. J. Surg.* 167 (6) (2001) 453–457.
- [39] A. Arroyo, P. Garcia, F. Perez, J. Andreu, F. Candela, R. Calpena, Randomized clinical trial comparing suture mesh repair of umbilical hernia in adults, *Br. J. Surg.* 88 (10) (2001) 1321–1323.
- [40] Bantu Rajsiddharth, Comparative study of onlay and pre-peritoneal mesh repair in the management of ventral hernias, *Int. J. Sci. Stud.* 3 (7) (2015) 121–128.
- [41] A.M. Malik, Mesh versus non-mesh repair of ventral abdominal hernias, *J. Ayub Med. Coll. Abbottabad* 20 (3) (2008) 54–56.
- [42] S.S. Bessa, A.M. El-Gendi, A.H. Ghazal, T.A. Al-Fayoumi, Comparison between the short-term results of onlay and sublay mesh placement in the management of un-complicated para-umbilical hernia: a prospective randomized study, *Hernia* 19 (1) (2005) 141–146.
- [43] A.N. Kingsnorth, M.K. Shahid, A.J. Valliattu, C.S. Hadden R.A Porter, Open onlay mesh repair for major abdominal wall hernias with selective use of components separation and fibrin sealant, *World J. Surg.* 32 (1) (2008) 26–30.