Comparison of Complete Sinus Excision and Reconstruction with Sinus Excision and Umbilical Preservation for Treatment of Umbilical Pilonidal Sinus

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Abstract

Background: Umbilical pilonidal sinus is a granulomatous reaction to hair shaft penetrating the epidermis of umbilicus from the external surface. In this study, the outcome of complete excision of the umbilical sinus with umbilical reconstruction and sinus excision with umbilical preservation is considered.

Methods: This study was a clinical trial. In this study, 60 subjects with umbilical pilonidal sinus were enrolled into two groups (Group I, complete excision of the umbilical sinus with umbilical reconstruction, n = 30, Group II, sinus excision with umbilical preservation n = 30). Discharge, bulging, pain, bleeding, and itching of umbilicus and existence of hair were registered in the base visit and then 1 and 2 weeks, and 1, 3, and 6 months later. Patients with umbilical pilonidal sinus, who had not undergone any previous surgeries, were operated on using a technique that involves complete excision of the umbilical sinus followed by reconstruction of the umbilicus or sinus excision with umbilical preservation. Patients were then followed and wound complications, and recurrence were evaluated at post-operative visits (1 week, 2 weeks, 1 month, 3 months, and 6 months later). Remission and relapse of each symptom were compared. Data were analyzed by SPSS version 16.

Results: A total of 60 patients underwent the operation; 55 (91.7%) were male, and 5 (8.3%) were female. The mean age in Group I, complete excision of the umbilical sinus with umbilical reconstruction was 29.9 years (18-45 years) and mean age of Group II, sinus excision with umbilical preservation was 28 years (19-42). The mean follow-up period was ٦ months. Only one patient in Group I, complete excision of the umbilical sinus with umbilical reconstruction had seroma and hyperemia of the skin after the operation, and treated conservatively at an outpatient clinic. No recurrence was observed during the follow-up period, and the most patients were satisfied with the appearance of their umbilicus. The two groups were not different by the means of age, sex and symptoms at baseline ($P > 0.050$). Remission of symptoms were not significantly different in the two groups ($P > 0.050$). The probability of relapse of other symptoms were not different in two groups ($P > 0.050$).

Conclusions: Umbilical sinus excision with umbilical reconstruction is a relatively simple and effective surgical option for treating umbilical pilonidal disease with acceptable patient satisfaction and no serious complications. It may also be associated with a low risk of recurrence.

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Introduction

Umbilical pilonidal sinus is a granulomatous reaction to hair shaft penetrating the epidermis of umbilicus from the external surface. Although the umbilicus was first recognized as a site of pilonidal disease nearly 150 years ago, the condition was not recorded until recent years. Current report indicates that is more common in the general population than was generally thought (1,2). Although the view is divided about the etiology of sacrococcygeal pilonidal sinus, there is little doubt about the origin of umbilical pilonidal sinus as an acquired disease (3-7). Because of the rarity of the disease, opinions about the treatment of the disease

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also differ (1-4).

In this study, we aimed to evaluate two ways surgical treatment of umbilical pilonidal disease. The aim of this study is to describe a modified surgical technique for the treatment (complete sinus excision with reconstruction of umbilicus and sinus excision with umbilical preservation) and prevention of recurrent disease.

Materials and Methods

This study was carried out on cases with umbilical pilonidal disease that refused surgical treatment as the first line treatment. Between January 2010 and January 2013 all patients with history of recurrent, intermittent bloody or purulent discharge or itching form their umbilicus who had never undergone surgery for their disease were considered. Patients who had a history of previous abdominal surgery were excluded from the study. If a sinus orifice could be detected in the umbilicus, the patient was entered into the study. There was no fever or intra-abdominal symptoms. On examination, after cleaning pus from the umbilicus, bits of hair could be seen in the depths of the umbilicus.

The patients were admitted the day before operation, and all received pre-operative intravenous antibiotics (cefazolin 500 mg) 30 minutes before the start of the operation. All operations were performed by a single surgeon under general anesthesia.

In Group I: The patient is prepared and draped in supine position. A curved incision is made along the inferior border of the umbilicus starting at 5 o'clock and extending to 8 o'clock. The incision is deepened to cut the dermis, and the subcutaneous tissue is dissected to arrive at the fascia along the full length of the incision. Then, using scissors to cut through the subcutaneous fat and just superficial to the fascia, a plane is developed around the umbilical attachment to the fascia to encircle this attachment. After full detachment of the umbilical stalk from surrounding subcutaneous tissue, the stalk is cut from its point of attachment to the underlying fascia. The umbilicus is then completely everted by inserting an index finger from underneath and pushing the cut stalk outward while holding the cut edge of the umbilicus with the thumb of the same hand. With this maneuver the sinus becomes everted too, although it may be necessary to use a small-tipped instrument to drive the base of the sinus out. A transverse elliptical incision is made on the everted side of the umbilicus, and the sinus is excised completely (Figures 1 and 2). This elliptical incision is then repaired by separate absorbable sutures from underneath. The center of the repaired umbilicus is now secured to the old attachment point to the fascia by a single non-absorbable or delayed absorbable suture. If a sinus had a central position, the umbilicus should be sutured to the fascia at the center of the repaired elliptical incision made for removal of the sinus, and If the sinus was peripheral, a new center of the umbilicus is chosen. Then the skin is closed using the running subcuticular technique with either absorbable or non-absorbable suture. Selecting the location of the initial infra umbilical incision is critical to provide an adequate skin margin for closure and maintenance of umbilical symmetry. The new umbilicus invariably has less depth than the original one.

Figure 1. In Group I, complete excision of the umbilical sinus with umbilical reconstruction sinus is completely everted. The whole sinus is now seen

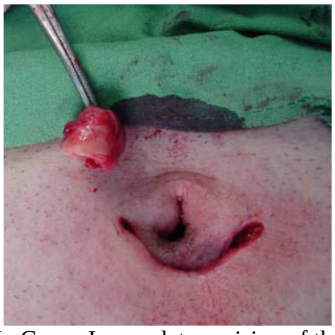

Figure 2. In Group I, complete excision of the umbilical sinus with umbilical reconstruction sinus is completely excised. The defect in the umbilicus is ready to be repaired

In Group II: Under general anesthesia, careful inspection revealed a 3 mm ulcerated site in the depth of the umbilicus from which bits of hair protruded. A vertical skin incision through the umbilicus skirting one side of the sinuses was made. Diathermy cutting was used to minimize bleeding and ensure visibility of the lesion (Figures 3 and 4). These communicated with a single subcutaneous tract that reached the sheath in the midline but did not branch laterally. All of openings and the tract were completely excised using a probe, approaching the tract superiorly, inferiorly, and laterally deep to the umbilicus, excluding the umbilical cicatrix and thus preserving it. The skin was closed primarily with subcuticular technique with either absorbable or non-absorbable suture.

Postoperatively, the patients received three more doses of the same intravenous antibiotic. The patients were hospitalized for 1 day. They were discharged the day after surgery with oral cephalexin 500 mg 4 times a day for 7

days. An outpatient visit was scheduled for each patient the next week. The patient was advised to pay a visit 1 week, 2 weeks, 1 month, 3 months, and 6 months later. The sutures removed 10 days postoperatively.

Figure 3. Group II, sinus excision with umbilical preservation sinus is completely excised

Figure 4. Group II, sinus excision with umbilical preservation Incision through

Data were analyzed using SPSS for windows (version 16; SPSS Inc., Chicago, IL, USA), and chi-square was used for comparison.

Results

In this study, 60 cases were included. Patients were divided into two groups. Group I included 30 cases of umbilical pilonidal sinus were appropriate for complete sinus excision with reconstruction of umbilicus treatment. 30 cases underwent surgical treatment sinus excision with umbilical preservation. Of 60 cases, 55 (91.7%) cases were male and 5 (8.3%) were female. Of 30 cases who treated Umbilical sinus excision with the umbilical reconstruction of umbilical pilonidal sinus in 28 (93.3%) cases were males and 2 (6.7%) were females. A total of 30 patients were treated sinus excision with umbilical preservation for pilonidal sinus disease, 27 of whom (90%) were men and 3 (10%) were women. Their ages ranged from 18 to 45 years, with a mean age of 29.9 years in Group I, complete excision of the umbilical sinus with umbilical reconstruction and mean age of 28 years in Group II, sinus excision with umbilical preservation.

About 12 patients (20%) complained of umbilical pain as the presenting symptom. Bloody and purulent discharge from the umbilicus were associated symptoms in 12 (20%) and 20 (33.3%) patients, respectively. 11 patients (18.3%) had an umbilical mass, and 20 (33.3%) had umbilical redness on physical examination.

The main outcomes of the study were wound complications (bleeding, infection, and non-healing), recurrence, and patient satisfaction. Patient satisfaction was assessed using a verbal scale (dissatisfied, acceptable, and satisfied). These outcomes were evaluated at each post-operative visit.

Minor complications were encountered in one case in Group I, complete excision of the umbilical sinus with umbilical reconstruction: seroma and hyperemia of the skin treated conservatively at outpatient clinic. No recurrent disease was found in 6 months of follow-up. All the patients in Group II, sinus excision with umbilical preservation and 60% in Group I, complete excision of the umbilical sinus with umbilical reconstruction were satisfied with the cosmetic results of the procedure (Table 1).

During the first post-operative visits, one patient had wound discharge. This patient was followed conservatively but finally we opened and drain their wounds after incessant discharge for about 3 weeks. The wounds healed in all other patients without any complication. Pathology reports could be obtained and reviewed for 60 patients, and they invariably revealed chronic inflammation.

Table 1. Satisfaction of the appearance of umbilicus in two groups: complete excision of the umbilical sinus with umbilical reconstruction and sinus excision with umbilical preservation

	Group I (complete excision of the umbilical sinus with umbilical reconstruction) n = 30	**Group II (sinus excision with umbilical preservation) n = 30**	**P***
Yes	Number (%) 18 (60)	Number (%) 30 (100)	< 0.001
No	12 (40)	0 (0)	
Total	30 (100)	30 (100)	

P* = chi-square

Table 2. Type of symptome among two group complete excision of the umbilical sinus with umbilical reconstruction and sinus excision with umbilical preservation

	Group I (complete excision of the umbilical sinus with umbilical reconstruction)	Group II (sinus excision with umbilical preservation)	Total (Group I and II)	P*
Purulent discharge	Number (%)	Number (%)	Number (%)	
Yes	9 (30)	11 (36.7)	20 (33.3)	0.500
No	21 (70)	19 (63.3)	۴۰ (66.7)	
Bad odor				
Yes	3 (10)	6 (20)	9 (15)	0.470
No	27 (90)	24 (80)	51 (85)	
Umbilical mass				
Yes	7 (23.3)	4 (13.3	11 (18.3)	0.310
No	23 (76.7)	26 (86.7)	49 (81.7)	
Umbilical redness				
Yes	13 (43.3)	7 (23.3)	20 (33.3)	0.100
No	17 (56.7)	23 (76.7)	40 (66.7)	
Bulging				
Yes	1 (3.3)	3 (10)	4 (6.7)	0.600
No	29 (96.7)	27 (90)	56 (93.3)	
Pain				
Yes	5 (16.7)	7 (23.3)	12 (20)	0.500
No	25 (83.3)	23 (76.7)	48 (80)	
Bleeding				
Yes	6 (20)	6 (20)	12 (20)	1.000
No	24 (80)	24 (80)	48 (80)	
Itching of umbilicus				
Yes	4 (13.3)	4 (13.3)	8 (13.3)	1.000
No	26 (86.7)	26 (86.7)	52 (86.7)	
Existence of hair				
Yes	3 (10)	7 (23.3)	10 (16.7)	0.160
No	27 (90)	23 (76.7)	50 (83.3)	

P* = chi-square

The mean follow-up period was 6 months. No recurrences were observed throughout the follow-up period. All of the patients in Group II, sinus excision with umbilical preservation was dissatisfied with the appearance of his or her umbilicus. In Group I, complete excision of the umbilical sinus with umbilical reconstruction 60% were satisfied, 40% said that its appearance was acceptable (P = 0.001). There was no significant difference between rates of successful surgical treatment among cases. There was no significant different between different symptom of manifestation (Table 2).

In the exploration, severe granulomatous reaction secondary to umbilical pilonidal sinus was detected, and there was no hernia. There was no recurrence at follow-up after surgery. Microscopic examination of the umbilical specimen showed a small cavity lined with stratified squamous epithelium. The sinus contained a few hair shafts, epithelial debris, and keratin. The sinus wall showed chronic inflammatory infiltrate including lymphocytes and histiocytes (Figure 5).

Discussion

The first description of pilonidal sinus disease of the umbilicus was recorded 150 years ago. Pilonidal sinus commonly occurs in the sacral region and involvement of the umbilicus is a rarity, with only a few cases being documented in the literature. Patey and Williams documented the first case of umbilical pilonidal sinus in 1956 (2).

Figure 5. Microscopic biopsy sections showed squamous epithelium overlying a fistulous tract lined by granulation tissue and chronic inflammatory cells containing hair shafts consistent with umbilical pilonidal sinus; sinus with hair shaft surrounded by lymphoplasmacytic infiltrate

It is caused by hair penetrating the skin, resulting in a foreign body reaction and development of a sinus lined by granulation tissue. The patient may be

asymptomatic initially or present with pain, discharge or bleeding from the swelling until the 1980s, however, only approximately 20 cases have been reported in the literature (8). Pilonidal sinus disease is a common problem of sacrococcygeal region. However, it is also observed in the per umbilical area (3). Male sex, young age, heavy hirsutism, deep navel and poor personal hygiene are the most common predisposing factors (3). This is a disease of young, hirsute, adult males. In our study, 91.7% of the patients were male. The male preponderance is perhaps due to hirsutism and the unique distribution of hairs around the umbilicus with the distal ends pointing toward the umbilicus whereas in women the hairline is usually located well below the umbilicus (9).

Patients with umbilical pilonidal sinus usually present with pain, and bloody or purulent discharge from the umbilicus. Local tenderness and redness appear infrequently and may indicate abcess formation (2-8). It can present with discharge, soreness or pain, swelling, and cellulitis (5). In this study, 12 patients (20%) complained of umbilical pain as the presenting symptom. Bloody and purulent discharge from the umbilicus were associated symptoms in 12 (20%) and 20 (33.3%) patients, respectively. 11 patients (18.3%) had an umbilical mass, and 20 (33.3%) had umbilical redness on physical examination.

Differential diagnosis of the umbilical pilonidal sinus with other umbilical disorders including umbilical hernia, endometriosis in women, metastatic tumors (Sister Mary Joseph nodule, etc.), umbilical adenoma, remnant of omphalomesenteric ducts, congenital pathologies such as urachus anomalies, pyogenic granulomas, and benign, tumors like nevus should be kept in mind (5-8).

Umbilical pilonidal sinus, although uncommon, can become complicated by inflammation, cellulitis, and suppuration. Usually, it tends to recur after conservative treatment. Several affected patients never undergo invasive investigations.

Various surgical procedures have been suggested for its treatment, but most of them were based on experience with few cases. The treatment of pilonidal sinus disease is not uniform. Most of the cases reported in the literature were treated with surgical excision. Authors who suggest the surgical excision assert that there is a risk of peritoneal extension of inflammation (1-6). Umbilical pilonidal sinus carries a risk of peritoneal extension of inflammation, therefore, it should be included in the differential diagnosis of umbilical nodules and treated more aggressively than its sacrococcygeal counterpart (1). In our study, 100% of cases complete sinus excision with reconstruction of the umbilicus and all of cases of sinus excision with umbilical preservation respond to treatment. It shows surgical treatment may be an appropriate method for treatment.

Erylmaz et al. (3) reported successful conservative treatment in 25 of 26 cases. Some authors suggested surgical treatment due to possible risk of extension of inflammation to peritoneal space (1,2,4-6).

However, no report in the literature indicates that peritonitis develops from untreated or conservatively treated umbilical pilonidal sinus disease. Therefore, some authors recommended non-surgical treatment. They believed that disease is not congenital in origin, there is no need to excise the umbilicus. Besides, they believe that the disease would terminate naturally after the age of 30 (7,8,10). In this study, their ages ranged from 18 to 45 years, with a mean age of 29.9 years in Group I, complete excision of the umbilical sinus with umbilical reconstruction and mean age of 28 years in Group II, sinus excision with umbilical preservation.

There is no agreement concerning umbilical reconstruction among published series (2-4). As an alternative to surgical management, some experts have recommended conservative treatment such as removing the hair (11).

Total omphalectomy is advocated as the definitive treatment by many authors (2-5,9,12) to avoid recurrence.

We performed sinus excision with umbilical reconstruction in 30 patients and sinus excision with umbilical preservation in 30 patients with umbilical pilonidal disease. We encountered no recurrences or serious complications in our study. Total omphalectomy may still be indicated, but it is probably justified only for treating recurrent disease (13).

In a retrospective study by Haj and Cohen, 12 ambulatory patients with umbilical pilonidal sinus underwent an operation similar to the one described here to excise the sinus complex with primary repair of the umbilicus. Few wound complications were observed (one case of serosanguineous discharge and one of peri-incisional hyperemia). The patients were satisfied with the resultant new umbilicus, and no recurrences were observed during the 6 months follow-up. Authors ascribed the lack of recurrence to a shallow umbilicus that was easy to keep clean (12).

This study suffers from some limitations. First, the follow-up period may not have been long enough to detect recurrences. Our esthetic evaluation was also imperfect because we have not provided our patients with any objective means of assessment, nor have we asked any expert (e.g., a reconstructive surgeon) to give his or her opinion about the appearance of the "new" umbilicus. In our study, result of surgical treatment in younger patients was more favorable than older cases however there is no significant difference.

In Erylmaz et al. study (3), 92% of cases were male. In fact, most series of umbilical pilonidal occurred exclusively in men. There are quite a few numbers of women in the literature. In our study, 91.7% of cases were male and 8.3% of cases were female. This difference may

be the result of difference of umbilical sinus disease risk factors between populations.

Although the most common recommended surgical treatment for umbilical pilonidal sinus is umbilectomy (1-4,8,14). This may be more radical than necessary. It appears that this disease is significantly different from the sacrococcygeal variety because the recurrence rate is low, and conservative treatment by simply cleaning the area and removing the fragments of hair often results in cure (11). Neither of these is true for sacrococcygeal pilonidal disease.

Although most surgeons extend a midline incision around the umbilicus, it has been shown that cutting through the umbilicus has no disadvantage and is superior cosmeticall (9). In Group II, we chose to incise through the umbilicus, not only for these reasons, but also because it offers a direct approach and excellent exposure of the pathology, especially if meticulous hemostasis is ensured using diathermy. A direct approach to the lesion is not only likely to produce a cure, but also offers an opportunity to better understand the pathology and anatomy of this uncommon lesion and to appreciate its differences from the sacrococcygeal disease.

In summary, umbilical pilonidal sinus can be successfully managed by excision of the sinus with umbilical preservation, without the need for umbilectomy. This limited resection is likely to be effective because the umbilical pilonidal disease is significantly different from the sacrococcygeal condition, with low recurrence rates and absence of multiple tracts. In addition, incision through the umbilicus results in a better cosmetic result and more accurate appreciation of the anatomic pathology than umbilectomy or a periumbilical incision. A simple surgical technique for the treatment of umbilical pilonidal sinus is proposed. Besides its satisfactory results in eradicating the disease, it is cost effective.

Conclusion

In this study, we found no significant difference between two surgical way complete sinus excision with reconstruction of umbilicus and sinus excision with umbilical preservation and all of the cases respond to surgical treatment. Surgical treatment may be an appropriate option for treatment of umbilical pilonidal sinus disease in uncomplicated cases. The result of the sinus excision with umbilical preservation treatment is satisfactory in patients with umbilical pilonidal sinus, and complete sinus excision with reconstruction of umbilicus should be performed only in recurrent cases resistant to the sinus excision with umbilical preservation treatment. Umbilical sinus excision with umbilical preservation is a relatively simple and effective surgical option for treating umbilical pilonidal disease with acceptable patient satisfaction and no serious complications. It may also be associated with a low risk of recurrence. Another study with more cases and more time follow-up is recommended to confirm this method of treatment.

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