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Pathological and therapeutic profiles of umbilical sinus

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Abstract

Background and objective: Umbilical sinus develops either in an abnormal embryonal remnant of Omphalomesenteric & Urachal ducts, or secondary to hair insertion in the umbilical skin with resultant suppuration ending in what is named umbilical pilonidal sinus.This study viewed the relative distribution of these pathologic variants and results of management options adopted.

Methods: All patients (n=28) suffering from umbilical sinus disease during the period of 5 years, between 1st Jan 2015 to 31st Dec 2019 are evaluated according to their pathologic types and therapeutic options. For hair sinuses, the conservative approach was initiated, its failure demanded exploration without excision.

For sinuses secondary to embryonal remnants, the treatment was complete tract excision.

Results: Umbilical pilonidal sinus constitutes the majority of sinuses in the umbilicus (n=26) (92.86%), suppuration in Embryonal remnants was far less common (n=2) (7.14%).

The conservative management was effective in 24 (92.3%) out of 26 patients who were presented with umbilical pilonidal sinus, two patients got recurrence (7.14%), and necessitated tract exploration.

Sinuses secondary to embryonal remnants (7.14%), were dealt with complete tract excision.

In the results also; umbilical pilonidal sinuses were associated with young age group, (78.57% were between 21 and 30 years of age), male gender (85.71%) and overweight, (60.71%).

Conclusion: The conservative approach was successful in the majority of cases, failure was mainly due to incomplete hair removal, for such cases a valid alternative was sinus exploration. Sinus tract excisions were spared for sinuses secondary to Omphalomesenteric & Urachal sinuses.

Keywords: Umbilical pilonidal sinus; Sinus depth; Urachal; Omphalomesenteric sinuses.

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Introduction

A sinus is a blind tract that connects an abnormal cavity to an epithelial surface, this tract is usually lined with granulation tissue[1]. It can develop anywhere in the body, including the umbilicus. Suppurative focus in the umbilicus develops either in an abnormal embryonal remnant or due to acquired extrinsic factor. Embryonal remnants are related to Omphalomesenteric, or Urachal remnants, persistence of all or portions of the omphalomesenteric duct can result in fistulas, sinus tracts, cysts, and congenital bands[2,3]. The Urachus or the Median umbilical ligament is a fibrous strand connecting umbilicus to bladder, it is an embryologic remnant of cloaca and allantois it can remain completely patent forming a urinary fistula to the umbilicus; or partially patent forming a sinus or a cyst. they are prone to infection and malignant change[3,4]. The acquired factor, as far known, is the insertion of hair in the umbilical skin with resultant suppuration ending in what is named Umbilical Pilonidal Sinus (UPS), In 1833, Herbert Mayo mentioned a hair-containing sinus, and in 1880 Hodge suggested the term "pilonidal" (Latin: pilus = hair and nidus = nest)[5]. The most common place for pilonidal sinus (PNS) is the post sacral region, but other sites like the interdigital, axillary, inguinal, umbilicus, neck, face, and the scalp[6]. There are two theories for PNS development, some are believed to be congenital in origin, and some consider it an acquired disease and the reason to this is that this condition can be seen in folds between the fingers of hair dressers and shepherds which can be due to hair insertion[7-9], Short hair fragments, rootless sharp cut ends were found within pilonidal sinus tracts and cavities, they enter the pilonidal cavity more easily than longer hair[10]. Karydakis postulated that the hair insertion process depends on three main factors: the invader, i.e. the loose hair; the force, which causes the insertion; and the skin vulnerability, additional sinuses are possible and have lateral openings[11]. Malignant transformations are rare but squamous cell carcinoma and verrucous carcinoma were reported[12]. In spite of being considered a rare disease, PNS of umbilicus is seen occasionally at outpatient clinics. Patey and Williams were the first to describe the umbilical pilonidal disease in 1956[13,4]. The usual presentations of PNS are pain, swelling, and purulent discharge, acute abscess is also possible[13]. The predisposing factors include male gender, young age, hairiness, a deep umbilicus, family history, tight clothes, , body mass index (BMI) and poor personal hygiene, ttreatment range from conservative to a more aggressive approach such as total excision of the umbilicus followed by delayed reconstruction[13,15-6],The treatment of congenital sinuses is usually surgical excision[3]. The aim of this study is to review all cases of umbilical sinus disease (USD) presented to the authors within a 5 year time period, and to analyse their pathological type and therapeutic options adopted in each.

Subjects and methods

The study design is to evaluate the pathological types and therapeutic patterns of USD in a group of patients that have randomly presented to our outpatient clinic during a time period. All patients (n=28) who were suffering from USD during the period of 5 years between 1st Jan 2015 to 31st Dec 2019 classified according their pathologic type and therapeutic options. A study protocol approval by the scientific committee of College of Medicine/Hawler Medical University was gained on Dec 20-

2018 with a code No.13. Gender, Age, BMI of the participants were taken into consideration. Evaluation of the patients included, history taking, physical examinations, local examination of umbilical region. During inspection of the umbilicus, in all the patients (n=28), we were able to see the sinus opening with surrounding rim of redness and induration, and in19 patients there were few hairs protruding through the sinus. Probing of the sinus tract, was performed as a diagnostic and a therapeutic aid, it helps to elicit presence of hairs mixed with blood, pus, or debris, (their presence is a prove for the diagnosis of pilonidal origin of the sinus), probing also helped to measure the length of the sinus tract. Treatment started by taking a sample of the discharge for culture and sensitivity test, then cleaning of sinus tract, removing hairs, and washing with normal saline, during waiting for the result of culture and sensitivity test, a broad spectrum antibiotic was prescribed. After that, the proper instructions to the patient were given, (that is weight observation, umbilical hygiene and avoiding tight clothes). Recurrence following this conservative approach was dealt with another attempt of same conservative measures, failure of this 2nd attempt indicates the need of sinus exploration, that was done under local anesthetic infiltration of 1% Lidocaine solution (with adrenaline1:100,0000), Exploration was performed through creating an incision of 1-2 cm in length, starting from the mouth of the sinus, this helps opening the sinus tract making it amenable for inspection, cleaning, washing and providing a rout of effective drainage of sinus tract. when the discharge was profuse and of long duration, a congenital sinus was suspected, that necessitated a sinogram and Computerized Tomographic Scan (CT Scan), and when it is evident, the operative approach is to excise the sinus tract completely through abdominal exploration under general anesthesia. The Statistical Package for the Social Sciences (version 26) was used for data entry and analysis, categorized variables had been presented as frequencies and percentage. P value ≤ 0.05 is considered statically significant Exclusion criteria: No exclusion done.

Results

Among the total (n=28) patients with USD there were 24 (85.71%) males with p- value < 0.001 and 4 (14.29%) females, with male to female ratio of 7:1 (Table1). Their age distribution ranged between 22 and 38 years with mean average of 26.9 ±3.0 SD, most of the patients (n=22) (78.57%) were within the age group of ≤ 21-30 year with a p-value < 0.001, Table (1).

Table (1): Demographic characteristics of the participants

Variables	No.	(%)	Mean	SD	p-value
Gender					
Male	24	(85.71)			< 0.001
Female	4	(14.29)			
Total	**28**	**(100.00)**			
Age group					
≤ 21-30 y.	22	(78.57)			< 0.001
31- 38 y.	6	(21.43)			
Total	**28**	**(100.00)**	26.9	±3.0	

The BMI ranged between 23.4 and 32.5, with mean BMI of 25.6 and ±1.4 SD, the p-value for obesity = 0.257, which is insignificant, but there were significant association with overweight p-value < 0.007, Table (2).

Table (2): BMI of the participants

Variables	N0.	(%)	Mean	SD	p-value
Normal (BMI = 18.5 – 24.9)	7	**(25)**			
Overweight (BMI = 25 – 29.9)	17	**(60.71)**			0.007
Obese (BMI = 30 – 34.9)	4	**(14.29)**			0.257
Total	**28.**	**(100.00)**	25.6	±1.4	

Regarding the pathological types, there were 26 (92.86%) pilonidal sinus, one Urachal sinus (3.57%) and one Omphalomesenteric sinus (3.57%), Table (3) with p-value for PNS was < 0.001. which is highly significant.

Table (3): No. & (%) of each pathological type

Variables	No.	(%)	p value
Pilonidal	26	(92.86)	>0.001
Omphalomesenteric	1	(3.57)	
Urachal	1	(3.57)	
Total	**28**	**(100.00)**	

Among the total (n=28), of PNS patients, 24 (85.71%) patients treated conservatively (P-value < 0.001), while 4 (14.28%) patients needed surgery, of them only 2 (7.14%) patients namely those with congenital remnants needed formal exploration under general anesthesia, Table (4).

Table (4): incidence of management options

Method	No.	(%)	p-value
Conservative	24	(85.71)	< 0.001
Operative	4	(14.29)	
Total	**28**	**(100.00)**	

During the average follow up time of 6 months, there were no recurrence in both groups. Regarding PNS tract length, the longest one was only 3cm. Omphalomesenteric sinus was 5cm and Urachal sinus was 7.5cm, both tracts were continuous with a fibrous band that connects them to their organ of origin.

Discussion

Discharging umbilical sinuses develops either secondary to chronically inflamed embryonal remnant, or following an acquired factor. Embryonal remnants are

related to Omphalomesenteric, or Urachal remnants, persistence of all or portions of the omphalomesenteric or Urachal ducts can result in fistulas, sinus tracts, cysts, congenital bands, and mucosal remnants[2,3]. Acquired factor, as far known, is the hair insertion in the umbilicus with resultant suppuration ending in what is named Umbilical pilonidal sinus. In the study; male gender is more prone for the disease (85.71%), the male to female ratio was 7:1, (Table1) this is a significant finding with p< 0.001, and comparable with the reported percentage of 90% in other studies[9-16]. Their average for age was 26.9 ±3.0 SD, and p< 0.001 (Table1), making young age a risk factor for the development of USD. The mean BMI in this study was 25.6 with ±1.4 SD (ranged between 23.4 and 32.5). Although obesity is known to be a risk factor in the etiology of USD[16], it was not so in our study, where the p-value for obesity (BMI = 30 – 34.9) was insignificant (p-value = 0.257), while it was highly significant (p < 0.007) for overweight (BMI = 25 - 29.9) which seems to have an association to USD. Pilonidal sinus variety was the most frequent one (92.86%) with p< 0.001, while Omphalomesenteric duct sinus and Urachal sinuses had frequency of (3.57%) for each. There are no guidelines for the management of PNS, however, for discharging sinus the conservative management which include hair extraction from the sinus tract, periumbilical hair depilation, good personal hygiene and avoiding tight clothing, is the first line of management[18], In their largest series on umbilical sinus Kareem, and Sarmast et al., concluded that conservative treatment should be the first and the main method in the management of UPS[18-20]. They have also found that complete hair extraction is vital to help success of conservative management[18]. Proper instructions to the patient at time of follow up can add to reduce the recurrence[19]. In our study, the conservative approach was successful in 24 (92.3%) out of 26 patients with PNS, this result is near to the success rate (97.76%) of conservative approach obtained by Kareem[19]. Failure of conservative treatment occurred in two patients (7.14%) after twice attempts, this failure was due incomplete hair extraction and necessitated operative interventions, this intervention was in the form of opening the tract under local anesthesia, allowing better visualization, hair extraction, tract cleaning and tract curating. This approach was different from the operative approach adopted by Kareem[19] and Sarmast et al[20], which entails the complete excision of the tract, a more demanding and radical approach. Umbilical pilonidal tracts were short, not more than 3 cm in length, this goes with other study findings[21], and can explains the frequent observation of visible hairs at the sinus opening especially when the tract was relatively short[22]. For sinuses secondary to embryonal remnants, operative approach in the form of formal exploration[3] under general anesthesia, was successful.

Conclusions

Most umbilical sinuses were of pilonidal variety; Male gender, young age and overweight were risk factors. The conservative approach was sufficient in the vast majority of cases, failure was mainly due to incomplete hair removal, for such cases a valid alternative was opening the sinus tract under local anesthetic infiltration, and clearing it of hairs and debris. Sinus tract excisions were spared for sinuses secondary to embryonal remnants, i.e. Omphalomesenteric & Urachal sinuses.

Conflicts of interest

There were no conflicts of interest.

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