PILONIDAL SINUS MANAGEMENT: CHOICE OF THE SUITABLE PROCEDURE FOR THE APPROPRIATE PATIENT

Thesis
Submitted for Partial Fulfillment of
M.D Degree in General Surgery

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2005

To My Family

Especially my lovely daughters, Maryam & Karin

Acknowledgement

First and foremost, my thanks are to **God**.

I would like to express my deep feelings to Prof. Dr. **Hassan Zakaria Shaker,** Professor of General Surgery, Faculty of Medicine, Ain Shams University, for his valuable advice, constructive criticism, true encouragement and keen interest in the progress and accomplishment of this work.

I am also very grateful to Prof. Drs. **Ismail Abdel Hakim Kotb** and **Samy Ahmed Abd Al-Rahman**, Professors of General Surgery; Dr. **Amr Magdy Sayed Mahmoud,** Assistant Professor of Plastic Surgery, and Dr. **Mohamed Hamdy Hammoda**, Lecturer of General Surgery, Faculty of Medicine, Ain Shams University, for their cooperation, sincere advice and wise observations during preparation of this work.

Finally, my appreciation and gratitude are to all my professors with special thanks to my dear wife for their remarkable support and encouragement.

Ayman Andrawis

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Introduction

The first record of surgical cure of pilonidal sinus was made by Anderson in 1847 in a paper entitled 'Hair extracted from an ulcer', but Hodges in 1880 was the first to introduce the expressive term 'pilonidal sinus' to describe a chronic infection that contained hair and was usually found between the buttocks, situated a short distance behind the anus (postanal). The term pilonidal sinus originates from the Latin words *nidus* for nest, *pilus* for hair and *sinus* for connections to skin. So common was postanal pilonidal sinus among jeep riders in the 1939-45 war, that it became known as jeep disease' (Russell et al., 2004).

Pilonidal disease of the natal cleft is a common condition responsible for much morbidity, and its treatment places a burden on hospital and community resources. The disease remains a common recurring problem with a high cost to the population in terms of days of hospitalization, discomfort as an outpatient and the loss of both earning and production capacity (Tritapepe and Di Padova,2002).

The aetiology of pilonidal disease is unknown; the theory that it is congenital is largely discounted. In the natal cleft, it is thought that skin follicles are enlarged due to the shearing action of the buttocks. Hair then enters these follicles and infection ensues. Alternatively, it is held that hair may penetrate the skin directly. The deep intergluteal sulcus, in which loose hairs may collect, might probably be the most important casual factor in the pathogenesis of the pilonidal sinus. It is often easier to treat a condition successfully when its aetiology is clear and it is partly this uncertainty that makes pilonidal sinus disease difficult to treat (Senapati and Cripps, 2000).

The pathology of this condition is that of chronic sepsis. Epithelial lining of the midline pits extends for no more than 1-2 mm from the surface, below which chronic abscess cavities may ramify widely, but these are thought to be secondary to the pits, rather than the primary condition (Senapati and Cripps, 2000).

The annual incidence of pilonidal sinus is approximately 26 per 100,000, of which complex pilonidal sinuses are the minority. The symptoms usually commence during the third decade. Most pilonidal sinuses resolve with surgical treatment by the age of 40 years irrespective of the method of treatment. There is a male preponderance of 4:1 and it typically occurs in hairy young men. Patients may be asymptomatic, may present with chronic purulent natal cleft discharge or with an acute abscess (McGuinness et al., 2003).

Management of pilonidal sinus is frequently unsatisfactory. No method satisfies all requirements for the ideal treatment. In the absence of a clear aetiology and with widely varying manifestations, from a single uninfected sinus to a grossly infected network of tracks, it is not surprising that treatment methods are numerous and range from very simple measures (depilation/excision of the track) to extensive surgical procedures (wide surgical excision and plastic surgical repairs). All authors claim good results from their favoured treatments, but all admit to failures even after very extensive surgery (Tocchi et al., 2001).

With the general acceptance that pilonidal sinuses are acquired and with the abandonment of the congenital theory, treatment of pilonidal disease has progressively become less invasive and less aggressive. Treatment can now be offered as a day-case without admission to over-committed hospitals. Aggressive surgery can be reserved for patients with more complex sinuses and/or recurrent pilonidal disease. The direction of therapy for pilonidal disease has been

progressively modified either to remove the hair or to carry out a procedure with an incision, which avoids or eliminates the midline cleft. Surgery should not only eradicate the presenting sinus but should also aim to eliminate factors that predispose to formation of another sinus (Aydede et al., 2001).

Aim of the Work

The aim of this prospective randomized study is two folds. First, to re-evaluate the outcome of both Bascom's operation and Karydakis flap procedure in the surgical treatment of the simple primary cases of the sacrococcygeal pilonidal sinus; second, to analyze the results of Z-plasty and rhomboid flap in the surgical treatment of patients with more complex and/ or recurrent pilonidal disease. Each two surgical procedures were compared with respect to *hospital stay*, *healing time, time off work, postoperative morbidity, and recurrence rate*. Thus evaluation of such surgical techniques could be done, allowing *choice of the suitable procedure for the appropriate patient.*

Bascom’s operation is the procedure which places the main wound away from the midline with individual follicle removal. It can be done as a day-case procedure, undertaken with local anaesthesia. Karydakis procedure is a technique of asymmetric natal cleft wound closure. Rhomboid transposition flap is the procedure of rhombic excision of the pilonidal sinus and Limberg (rhomboid) flap closure. In Z-plasty operation, a narrow elliptical excision of the sinus is made, and the skin flaps are fashioned for subsequent Z-plasty.

Embryology and Surgical Anatomy

Davis and Starr (1945) had emphasized the irregularity of the surface epithelium of the skin of the natal cleft in embryo. The caudal midline zone is demarcated in some embryos by lateral clefts and becomes progressively distinct as the mesenchyme of the gluteal muscle masses differentiates on each side. This zone retains its distinctive anatomy in the adult causing deep natal cleft. This deep internatal cleft is one of the main factors that are accepted as important for the pathogenesis of sacrococcygeal pilonidal sinus and in the development of recurrences after primary surgical repair (Bozkurt and Tezel, 1998).

The skin of the natal cleft is thin and contrasts with the thicker texture of the skin of the buttocks proper and in many individuals manifests one or more dimples. The large dimples may contain hair follicles but their high content of desquamated keratin and inflammatory cells makes them be regarded as potential pilonidal sinuses (Davis and Starr, 1945). The developmental postanal skin dimples in children were well described by Haworth and Zachary (1955). They are simply exaggerated dimples of the skin overlying the tip of the coccyx to which they are attached by a fibrous band. They are lined by normal skin and in childhood are free from hairs, but presumably will grow hairs later (Goligher, 1984).

The natal cleft is maintained because the thin midline skin is tethered to the underlying ligamentous and aponeurotic fibres on the dorsum of the sacrum and coccyx by a dense well-defined and highly collagenous fascia (fibrous natal raphe). Thus the cleft is subjected to intermittent tensions producing subcutaneous negative suction force, which facilitates subcutaneous penetration of fallen hairs setting up a foreign body granulomatous reaction with secondary infection (Monro and

McDermott, 1965). Caudally, this fascia is continuous with a dense mass at the tip of the coccyx where the natal cleft enters the anal zone. Laterally, each layer of the natal cleft fascia is continuous with superficial fascia of the buttocks and its fibrous septa. Proximally, the fascia widens at the level of the posterior superior iliac spines to join the superficial fascia of the flanks. Some surgeons believed that spread of pilonidal sinus is governed by the local arrangement of this fascia of the natal cleft (Davis and Starr, 1945).

Blood supply of the natal cleft

The natal cleft possesses a poor blood supply derived mainly from the small medial twigs of the posterior perforating arteries from sacral foramina (secondary tracks of the sinus may enter the buttocks along these twigs). They run upwards on either side from the coccygeal branches of the lateral sacral artery (Davies and Starr, 1945).

Incidence

Sacrococcygeal pilonidal disease afflicts young adults after puberty. In a population study of Minnesota college students, pilonidal sinus was noted at routine physical examination in 365(1.1 per cent) of 31497 males and 24 (0.11 per cent) of 21367 females, but proportionately more females undergo treatment and so the ratio of male to female patients treated is roughly closer to 4:1. In 1985 over 7000 patients were admitted to hospitals in England for treatment of sacrococcygeal pilonidal disease, but this is likely to be underestimate of the prevalence of the condition because of untreated disease in the community, the ratio of males: females was 1.5:1. The abscess: sinus ratio (0.7:1) was lower for males (0.5:1) than for females (1.1:1). This may be because pilonidal sinus is more likely to be complicated, requiring multiple hospital admission, in males. The number of patients being treated annually for pilonidal disease in United States has been variously estimated to be between 40,000 and 70,000. The disease has its peak incidence between 16 and 20 years of age and remains high until age 25, when the incidence begins to decline rapidly (Allen-Mersh, 1990).

The observation that the onset of pilonidal disease coincides with puberty and that de novo pilonidal disease is rare after age 40 years is compatible with an association with sex hormones which are known to affect pilosebaceous glands. This may explain the earlier onset of the condition in women, being on an average 3 years earlier than males, since puberty occurs earlier in females than in males. Differences in incidence between races are also found. The incidence is highest among Caucasians and less among Africans and Asians. This probably results from differences in hair characteristics such as kinking, medullation, cuticular scale count and average curvature, and from different daily rates of hair growth between races. The condition rarely occurs in blonds; many of the patients are exceptionally hairy