ABSTRACT Objective: There are two main complications after surgery of complex fistula-in-ano: faecal incontinence and recurrence. Summary Background Data: To prevent incontinence of stools and flatus we require saving the anal sphincter muscle with tightening of seton using Roeder’s knot with specially designed Rajneesh’s seton knot pusher. Method: The study includes 40 patients who had undergone treatment of complex and high fistula-in-ano at Civil Hospital, Jalandhar from January 2010 to September 2012 and from September 2012 to January 2017 at Punjab Institute of Medical Sciences (PIMS). Results: Forty patients of complex fistula-in-ano were taken up for study with the age (mean ± standard deviation) of 35 ± 10.6 years. The Roeder’s knot was tightened with a median of 5 times (3-10 times) as OPD procedure. All the patients were on follow-up for a minimum period of 6 months, and none of the patients had any incontinence. Recurrence occurred in one case. There was breakage of thread at knot site with knot pusher in two cases. Conclusion: Tightening of seton using Roeder’s knot with Rajneesh’s knot pusher is safe, cost effective treatment for complex fistula-in-ano and follow-up is easy. Tightening of fistula is an outdoor procedure rather than replacing the loose seton. Patients were on the monitoring every week, and seton with Roeder’s knot tightened in O.P.D after application of 2% Xylocaine jelly. Incontinence was assessed according to Wexner’s score.

KEYWORDS: Seton, Roeder’s knot, Knot Pusher, Fistula-in-ano, Tightening

Introduction

Fistula-in-ano is a track lined by granulation tissue is an abnormal connection between the epithelial surface of the anal canal (usually); anorectal or rectum deeply to the perianal skin. Anal fistula originates from the anal glands, which are located between the two layers of the anal sphincter and which drains into the anal canal. If the outlet of these glands become blocked, an abscess form which is drained and does not heal completely. Abscess recur if the fistula seals, allowing accumulation of pus. It then points to surface again, and the process repeats. Fistula-in-ano is one of the common ano rectal problems with prevalence as high as 1.2 to 2.8 /10000 [1].

Park’s Classification of fistula is based on the location of its tract about the anal sphincter muscles: Intersphincteric, transsphincteric, supra sphincteric or extrasphincteric [2]. Intersphincteric is the most common and Extrasphincteric is the least common complex fistula. The inter-sphincteric space is the surgical plane between the internal and external sphincters and...
is found between the longitudinal muscle and external spincter, where it exists as a sheet of fat containing loose areolar tissue.

Modification of Park’s classification, i.e., tract crosses more than 30% to 50% of external Spincter, anterior in females, various tracts, recurrent due to the involvement of the anal spincter, chances of incontinence is quite high in the treatment of complex fistula [3,4]. Low-level fistulas open into the anal canal below the inner ring and high-level fistulas open into the anal canal at or above the internal ring.

Treatment option for fistula-in-ano is surgery with the goal of draining the infection, removing the fistulous tract, and avoiding recurrence with preservation of anal spincter function [5, 6]. Surgery may be performed at the same time as drainage of absces, although sometimes the fistula does not appear until weeks or years after the initial drainage.

A simple fistula is treated by fistulotomy (opening the fistulous tract) or fistulectomy curettage or cautery of the tract, and healing by secondary infection [7]. While most of the fistulas start as a simple single primary tract, recurrent infection eventually causes the formation of extensions (secondary tracts). Extensions may be inter-spincric, ischial, or supravaleator (pararectal). The ischiorectal fossa is the commonest site of ex-

material and method

In the study 40 patients who have under gone treatment of complex fistula-in-ano with tightening of seton using Prolene no. 1 applied by Roeder’s knot and pushed by specially designed Knot pusher, at Civil Hospital, Jalandhar from January, 2010 to September 2012 and from September, 2012 to January, 2017 at Punjab Institute of Medical Sciences (PIMS). Cases in the series were a complex high fistula or recurrent fistula or encircling > 30% of the external anal spincter. After clinically examining the patient and confirming the diagnosis, no patient was subjected to the radiological investigation to define tract. Counselling of patient regarding recurrence and incontinence was done. Bowel preparation was done in all patients with liquid diet 24 hours before surgery and enema at night.

All the patients were given spinal anaesthesia. In Operation theatre, patients were evaluated in the lithotomy position. Proctoscopy was done. An alcoholic solution of gentian violet in 3 ml syringe was used to strain the entire tract by injecting into the external opening using the stub of 21 G needle that has been broken about 3-5 mm from the stub. The probe is gently pushed through the external opening till the previously identified internal opening on proctoscopy.

The skin around the external opening was dissected around the tract up to the spincter; this core of tissue is then divided and drawn of the probe. The skin from the internal opening to the lateral portion of the tract was incised to allow the seton to settle onto the spincter. Prolene thread no.1 is passed in the eye of 3 mm blunt tip probe and is pulled out into the anal side of the opening. Then on Prolene thread Roeder’s knot is applied.

Making of Roeder’s knot-Keeping the thread between the thumb and index finger, a loop is made.

1. The single throw from right to left.
2. Back again under left to right making one full circle.
3. The tail end of the loop and back to complete one.
4. Four full circle throws on the tail end of the loop.
5. The closing tie is encircling both limbs of the loop to complete the final full circle.

The knot is tightened with the knot pusher (Figure 1). Short end was cut and long end of Prolene about 6 inches is placed on the side of the anus and secured with water proof bandage. Dry gauge dressing was used. The patient is discharged on 2nd post op day with antibiotics, analgesics and sitz’s bath and dry gauge dressing retained by tight fitting undergarments. Patients were on follow up after every week, and seton was tightened by knot pusher over the Roeder’s knot after application of Xylocaine 2% jelly and wait for 5 minutes.

Tight seton cuts very slowly through the spincter muscles. Because this process is prolonged (occurs over a period of months). Cut muscle is gradually replaced by the scar tissue. Therefore the seton slowly and progressively advances through the muscle, eliminating on its way the fistula tract as well. The seton becomes more and more superficial, and at some point, it either completely cuts through and falls off or is removed

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Table 2 Breakage.

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<td>95%</td>
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We operated 40 patients of complex fistula-in-ana were taken with Wexner’s Score. The seton becomes more and more superficial, and at some point, it either completely cut through and falls off or is removed by the surgeon.

Results

We operated 40 patients of complex fistula-in-ana were taken up for study with seton tied with Roeder’s knot with the age (mean ± standard deviation) of 35 ± 10.6 years. Thirty-two were male (80%), and 8 were female (20%). Two patients had diabetes. Thirty-two patients (80%) did not have any prior history of the perianal problem, while rest had a history of either perianal infection, avoiding recurrence while preservation of anal sphincter function [5,6]. Seton means any foreign material that is inserted into the fistula tract to encircle the sphincter muscle. The word Seton is derived from Latin word seta meaning bristle. Seton was first described by Hippocrates who used horse hair and linen as seton [9]. Ayurveda, the ancient science of Indian medicine, described the seton made from various salts used to cure anal fistula. This treatment is known as “Kushar Sutra” is prevalent in India even today. It was used in Europe until the 19th century, the traditional material for seton being a copper “Cheese Wix” with its end tied into a knot that was gradually tightened over several months. If the fistula is straight forward (involving minimum sphincter muscle), a fistulotomy may be performed, This procedure involves unroofing the tract, thereby converting the internal opening within the anal canal to the external opening and creating a groove that will heal from the inside out.

To prevent the greater risk of incontinence surgeon must assess cutting of sphincter muscle during fistulotomy.

In addition to seton, in some cases, fibrin glue made from plasma protein may be used to seal up and heal a fistula as opposed to cutting it open. The glue is injected through the external opening after cleaning the tract, and stitching closes the internal opening. A plug or collagen protein may also be used to seal and close the fistula tract.

Coring: In high fistula, sometimes a limited fistulotomy is performed to preserve the sphincter. The tract lying above is cored out with a curette. This ensures that all the granulation tissue is excised.

Endoanal advancement flap: Surgeon may core out the tract and then cut a flap into the rectal wall to access and remove the fistulous internal opening then stitches the flap back down. This is done to reduce the amount of sphincter muscle to be cut. LIFT (ligation of inter-sphincteric fistula tract): Under anaesthesia inter-sphincteric space is reached through the transverse incision. Fistula running across is identified and ligated using vicryl on either side. Part is excised; outer part is curetted through the external opening.

VAAFT Procedure (Video assisted anal fistula track ligation): Fine specialised endoscope is passed through the track, continuous irrigation and cauterised.

In this study, we found 0% incontinence and 0.25% recurrence rate in 40 patients treated with Roeder’s knot – seton pushed with Rajneesh’s knot pusher specially designed. Data on continence was determined by validated Wexner’s score in all the patients with complete follows up, which included incontinence of faeces as well as flatus.

A single surgeon did all the procedure. Different seton material has been used with the various rates of recurrence and incontinence, but this depends on expertise and judgement of the complexity of fistula by the surgeon [7].

It usually occurs in a pre-existing anorectal abscess which bursts spontaneously leading to fistula formation in 26-38% cases. [12]
Seton should be durable, cheap, non-toxic, non-allergic, and allow repeatedly tightening without causing pain [13, 14].

Prolene Seton application by Roeder’s knot stands out all above properties by just slipping knot in one direction and tightening can be done in O.P.D. easily without taking the patient to the operation theatre repeatedly for tightening. As a replacement of seton adds to the cost and risk of analgesia and anaesthesia to the patient. After tightening, none of the patients had intolerable pain for more than few minutes. This is attributed to a precise and controlled tightening of seton by Roeder’s knot pusher. This controlled and graduated tightening decrease incidence of incontinence and recurrence. None of the patients reported difficulty in walking and carrying out routine work.

Roeder’s knot seton tightening is unidirectional, and thread about 6 inches is retained in place by applying water proof bandage on one side of the anal region. Free movement and abrasion (irritation of the different gluteal tissue was prevented by placing dry gauge.

Roeder first described this knot way back in 1931 [13]. Roeder’s knot seton does not suffer the problem of loosening elastic tie [14]. Ligation of Inter Sphincteric Fistula (LIFT) is a good alternative but needs technical expertise for complex fistulas [15].

With fibrin glue, there was not much difference for recurrence or incontinence, but it is too expensive to be used in developing countries [16]. Minimal dissection of fistulous tract probed and dissected up to sphincter and then pass seton thread through probe eye and pass through the internal opening of the fistula with a little cut over the medial margin of anus so that seton get well to fit over the anal sphincter muscle is tightened with Roeder’s knot. This sphincter muscle complex is gradually cut through because of direct compression effect this will result in fibrosis around seton.

This fibrosis does not allow distraction of sphincter muscle and the resultant incontinence. In literature, a wide range of incontinence rates after cutting seton treatment, and Ritchie et al have concluded that there is no relation between incontinence and frequency of tightening the seton, or classification of fistula[8]. Gurur et al. used cable tie seton and found 0% recurrence and incontinence in 17 patients [17]. Recurrence of fistula depends on complexity and level of fistula, presence or abscess of horse shoe extension, the degree of lateral extension of external opening, failure to identify internal opening at initial surgery and experience of the surgeon [18]. Vatanseu et al. found in 32 patients treated with a cable tie and reported no recurrence, and mean healing time of 53 days [19]. The low recurrence rate in our study attributed to the factor mentioned above we identify internal opening by injecting gentian violet.

Conclusion

Roeder’s Knot seton application and tightening with specially designed Rajneesh’s knot pusher instead of routine tightening under anaesthesia is safe low cost and efficient treatment of complex fistula-in-ano. We recommend it for treating complex fistula-in-ano and advantage is no repeated anaesthesia and visit to operation theatre, as it is tightened as OPD procedure with knot pusher.

Authors’ Statements

Competing Interests

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

There were no financial support or relationships between the authors and any organization or professional bodies that could pose any conflict of interests.

References


