Original article

Multicentre observational study of outcomes after drainage of acute perianal abscess

L. Pearce[1], K. Newton[1], S. R. Smith[2], P. Barrow[4], J. Smith[5], L. Hancock[4], C. C. Kirwan[2,3] and J. Hill[1], on behalf of the North West Research Collaborative

Departments of General Surgery, [1]Manchester Royal Infirmary and [2]University Hospital South Manchester and [3]Institute of Cancer Sciences, University of Manchester, Manchester, [4]Salford Royal Hospital, Salford, and [5]Royal Blackburn Hospital, Blackburn, UK

Correspondence to: Miss L. Pearce, Department of General Surgery, Manchester Royal Infirmary, Central Manchester Foundation Hospitals NHS Trust, Oxford Road, Manchester M13 9WL, UK (e-mail: lpearce@doctors.org.uk)

Introduction: **Management of perianal abscesses has remained largely unchanged for over 50 years. The evidence for postoperative wound packing is limited and may expose patients to painful procedures with no clinical benefit and at considerable increased cost.**

Methods: **Patients were recruited in 15 UK centres between December 2013 and October 2014. Outcome measures included number of dressing (pack) changes, healing, recurrence, return to work/normal function, postoperative fistula *in ano* and health utility scores (EQ-5D™). Pain was measured before, during and after dressing change on a visual analogue scale.**

Results: **Some 141 patients were recruited (median age 39 (range 18–86) years). The mean number of dressing changes in the first 3 weeks was 13 (range 0–21), equating to an annual cost to the National Health Service of €6 453 360 in England alone per annum. Some 43·8 per cent of wounds were healed by 8 weeks after surgery and 86 per cent of patients had returned to normal function. Some 7·6 per cent of abscesses had recurred and 26·7 per cent of patients developed a fistula *in ano* by 6 months following surgery. Patients reported a twofold to threefold increase in pain scores during and after dressing changes.**

Conclusion: **Recurrent abscess is rare and fistula occurs in one-quarter of the patients. Packing is painful and costly.**

Paper accepted 11 February 2016

Published online 7 April 2016 in Wiley Online Library (www.bjs.co.uk). **DOI:** 10.1002/bjs.10154

Introduction

Ninety per cent of perianal abscesses are caused by infection of anal glands (cryptoglandular infection). Downward extension toward the perianal skin, forming a perianal abscess, was described by Parks[1] in 1961. Infection may spread alongside the rectum (ischiorectal), above the pelvic floor (supralevator), or between the muscles of the anal canal (intersphincteric)[2]. Extension across the midline results in a 'horseshoe' abscess.

Around 10 per cent of perianal abscesses are caused by Crohn's disease, tuberculosis, trauma, chronic inflammation, hidradenitis suppurativa, human immunodeficiency virus (HIV), sexually transmitted diseases, radiotherapy, malignancy or foreign bodies[3–7]. Perianal abscesses are a common and costly condition, affecting 18 000 patients each year in England[8].

Management of acute perianal sepsis has remained unchanged for over 50 years, and comprises surgical incision and drainage followed by continued internal wound dressing (packing) of the wound cavity until healed. Drainage under local anaesthesia and catheter drainage[9–11], suturing the cavity[12] and postprocedural sitz baths[13–15] have been investigated, but no evidence exists for their use.

Tonkin and colleagues[16] compared packing (20 patients) with no packing (23) of the perianal abscess cavity. Similar recurrence and fistula rates were found in the two groups, suggesting that packing of the abscess cavity is not beneficial. Perera and co-workers[17] randomized 14 patients and reported shorter healing times in the group without packing ($P = 0{\cdot}047$). Packing may cause patients unnecessary pain without clinical benefit and at increased cost. Increased pain in the postoperative period is a risk factor for chronic postsurgical pain[18].

Perianal fistula or fistula *in ano* (lined with epithelium or granulation tissue) between the anal canal and the perianal

skin can be associated with perianal abscesses. The reported rates of fistula formation are based on cohort studies and vary widely between 5 and 37 per cent[5,15,19,20].

The aim of this study was to assess clinical (recurrence, fistula rate), patient-reported outcomes (including pain and quality of life) and cost of postoperative care following incision and drainage. The study was also designed to inform the design of a randomized clinical trial comparing packing with simple dressing of perianal abscess wounds.

Methods

Patients with a primary perianal abscess undergoing incision and drainage between 13 December 2013 and 31 October 2014 were enrolled across 15 UK National Health Service (NHS) centres. Written informed consent was obtained. Patients aged less than 18 years, those in whom the abscess was believed to be the sequela of concurrent disease or trauma, where Fournier's gangrene was suspected, patients with horseshoe abscess, and those unable to give informed consent were excluded. Ethical approval was granted by North West Liverpool East Committee of the National Research Ethics Service (13/NW/0552). The study outline is shown in *Fig. 1*.

Patients were recruited before surgery or before discharge, and underwent standard care according to local practice. Baseline demographic data and operative details, including American Society of Anesthesiologists (ASA) grade, time of surgery, grade of surgeon, incision, presence or absence of fistula *in ano*, fistulotomy, intraoperative packing of the abscess cavity and postoperative antibiotic use, were recorded. Outcome measures included: number of dressing or pack changes; frequency of healing at 4 weeks, 8 weeks and 6 months; frequency of abscess recurrence; time to return to work or normal function; postoperative fistula *in ano*; and health utility scores (EQ-5D™; EuroQol Group, Rotterdam, The Netherlands).

Quality of life

Quality of life was measured using the EQ-5D™ questionnaire. The first part of EQ-5D™ reports dimensions of mobility, self-care, usual activities, pain/discomfort and anxiety/depression, with a five-response scale: 'no problems', 'slight problems', 'moderate problems', 'severe problems' and 'unable to'. In the second part, subjects estimate health status from 0 to 100 on a visual analogue scale (EQ-VAS), where 0 was the worst and 100 the best imaginable health status. EQ-5D™ was evaluated daily for days 1–7, at day 14 and day 21 thereafter, and collected using a patient diary.

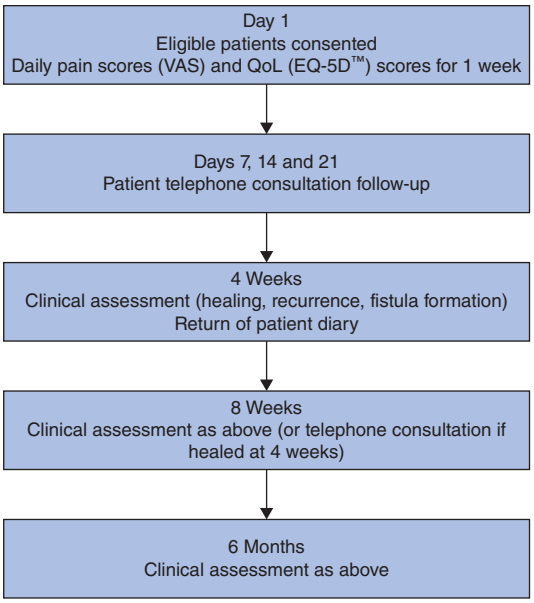

Fig. 1 Study outline. VAS, visual analogue scale; QoL, quality-of-life

Table 1 Patient demographics

	No. of patients* ($n = 128$)
Age (years)†	39 (18–86)
Sex ratio (M : F) ($n = 141$)	51 : 90
Height (cm)†	175 (148–206)
Weight (kg)†	82·6 (39–185)
Smoking status	
Never	52 (41·6)
Past	50 (40·0)
Current	23 (18·4)
Unknown	3

*With parentheses in percentages unless indicated otherwise; †values are median (range).

Pain

Pain was measured before, during and after dressing change from 0 to 100 on a VAS, where 0 was no pain and 100 the worst pain imaginable. For pragmatic reasons, patients were not restricted by a time frame of before or after dressing change, but were advised to wait 30 min to record pain scores after dressing change.

Clinical follow-up

Telephone contact was made on days 7, 14 and 21 after surgery, and a short open-question interview carried out. Clinical follow-up was undertaken for all patients 4 weeks after surgery, and patient diaries were returned. Patients were asked whether, if they had the same problem again, they would consider being part of a clinical trial comparing the use of packing with no packing.

Table 2 Operative details

	No. of patients ($n = 128$)
ASA grade	
I	72 (59·0)
II	42 (34·4)
III	8 (6·6)
IV	0 (0)
V	0 (0)
Unknown	6
Time of surgery (hours)	
08.00–16.59	85 (70·2)
17.00–23.59	33 (27·3)
24.00–07.59	3 (2·5)
Unknown	7
Grade of surgeon	
FY1/2	2 (1·7)
CT1/2	20 (16·8)
ST3–5	24 (20·2)
ST6–8	25 (21·0)
Middle or Trust grade	38 (31·9)
Consultant	10 (8·4)
Unknown	9
Fistula	
Yes	18 (14·6)
No	105 (85·4)
Unknown	5
Seton inserted	
Yes	11 (9·1)
No	110 (90·9)
Unknown	7
Fistulotomy	
Yes	3 (2·5)
No	118 (97·5)
Unknown	7
Postoperative antibiotics	
Yes	22 (18·3)
No	98 (81·7)
Unknown	8
Intraoperative packing	
Yes	118 (95·2)
No	6 (4·8)
Unknown	4

Values in parentheses are percentages. ASA, American Society of Anesthesiologists; FY, Foundation Year Trainee; CT, Core Trainee; ST, Specialty Trainee.

Clinical assessment included healing (epithelialization of the abscess cavity), recurrence, fistula formation, ongoing packing of the abscess cavity, and return to work or normal function. Those patients not healed were invited to further clinical follow-up at 8 weeks after surgery. Patients who had healed underwent telephone follow-up at 8 weeks. All were invited to a 6-month clinical follow-up.

Resource use and cost

Resource use was defined as the number of dressing or pack changes between day 1 and day 21 after surgery. Healthcare costs were calculated by the number of dressing changes and NHS unit costs for average dressing and community nursing costs.

Statistical analysis

Data analysis was carried out using R (version 3.2)[21]. Continuous data are summarized as mean and median (i.q.r.) values, and categorical data as frequencies with percentages. Comparisons were performed using paired *t* tests. $P < 0{\cdot}050$ was considered statistically significant.

Results

One hundred and forty-one patients were recruited. Demographic data and operative details were returned for 128 patients (90·8 per cent). Of recruited patients, 90 (63·8 per cent) were women, and the median age was 39 (range 18–86) years (*Table 1*). The majority of patients (93·4 per cent) had ASA grade I or II disease. At the time of surgery, 14·6 per cent of patients had a fistula identified and 2·5 per cent of all patients underwent fistulotomy. A linear incisional approach was most common (57·8 per cent; 74 of 128). Some 118 patients (95·2 per cent) had packing of the abscess after surgery and were discharged to a regime of ongoing packing by community nurses. Operative details are shown in *Table 2*. The study was completed as per protocol in 37 per cent of patients. Nearly half, 48·2 per cent (68 of 141), of the 141 patients recruited were lost to follow-up before the end of the follow-up period.

Clinical outcomes

At 8 weeks after surgery, 43·8 per cent (46 of 105) of all wounds had healed, 34·3 per cent (36 of 105) were unhealed, and 21·9 per cent (23 of 105) of patients had developed a fistula *in ano*. Return to normal function was achieved by 86 per cent (54 of 63) at 8 weeks. All 13 patients in whom there was no epithelialization of the abscess cavity at 8 weeks had either been identified as having a fistula or developed a fistula that was diagnosed at clinical follow-up 6 months after surgery. At the 6-month follow-up, 26·7 per cent (28 of 105) of patients had a fistula *in ano*, and 7·6 per cent (8 of 105) of abscesses had recurred. Of the 65 patients who were asked, all stated that they would consider being part of a clinical trial comparing packing with no packing if they had the same problem again.

Pain scores and quality of life

Overall, 1136 (38·4 per cent) of 2961 diary days were returned. Pain score profiles for each patient across time

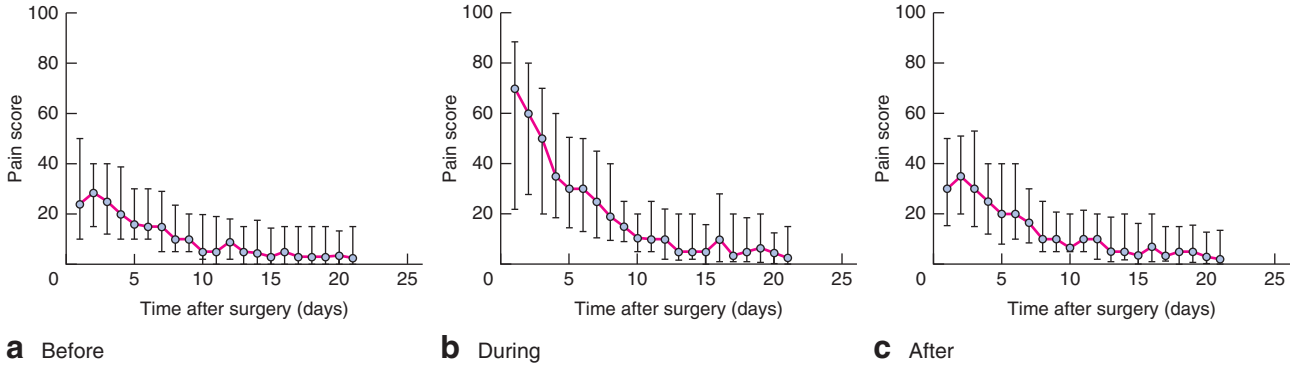

Fig. 2 Pain scored on a visual analogue scale (0–100 mm) **a** before, **b** during and **c** a minimum of 30 min after dressing change. Values are mean (i.q.r.)

Table 3 Pain scores

		Pain score*			*P*†		
Postoperative day	*n*	Before	During	After	Before *versus* during	Before *versus* after	During *versus* after
1	72	24 (10–50)	70 (22–89)	30 (15–50)	< 0·001	0·025	< 0·001
2	70	28·5 (15–40)	60 (28–80)	35 (20–51)	< 0·001	0·007	< 0·001
3	69	25 (12–40)	50 (20–70)	30 (15–53)	< 0·001	0·007	< 0·001
4	70	20 (10–39)	35 (19–60)	25 (12–40)	< 0·001	0·002	< 0·001
5	69	16 (10–30)	30 (15–51)	20 (8–40)	< 0·001	0·010	< 0·001
6	69	15 (10–30)	30 (13–50)	20 (10–40)	< 0·001	0·020	< 0·001
7	66	15 (5–29)	25 (11–45)	16·5 (9–30)	< 0·001	0·100	< 0·001
14	50	4·5 (0–18)	5 (2–20)	5 (2–20)	0·011	0·037	0·612
21	40	2·5 (0–15)	2·5 (0–15)	2 (0–14)	0·079	0·144	0·413

*Values are median (i.q.r.) scores across the first 3 weeks after surgery, measured by visual analogue scale (0–100 mm: no pain, 0; worst pain imaginable, 100) before, during and at least 30 min after dressing change. †Paired *t* test.

and mean pain scores are shown in *Fig. 2*. Cumulative rates are reported, and missing data were inferred using the last record carried forward approach. Nearly half (44 per cent; 23 of 52) of all patients described severe pain (VAS of at least 75 mm)[22–24] during pack change on the first day after operation, compared with 7 per cent (4 of 59) before and 12 per cent (6 of 52) after change of packing. Some 7 per cent of patients (3 of 44) described severe pain during packing on day 7 after surgery.

Patients reported a twofold to threefold increase in pain scores during and after dressing changes. As expected, pain scores were markedly increased ($P < 0{\cdot}001$) during dressing change. However, the scores were still increased at over 30 min after dressing change compared with pre-dressing scores ($P < 0{\cdot}001$). This was consistent until day 7 after operation. Pain remained increased during dressing change, compared with predressing, until day 14 ($P = 0{\cdot}011$) (*Table 3*). At all phases of dressing change (before, during and after), pain scores clearly decreased, from day 1 to day 7, from day 7 to day 14, and from day 14 to day 21 ($P \leq 0{\cdot}002$).

Each individual component of EQ-5D™ is scored between 1 and 5. Component summaries are presented using the component mean (95 per cent c.i.). Overall health is measured using a VAS and summarized as a mean (95 per cent c.i.). Improvements were seen in EQ-5D™ quality-of-life scores across all components over the 21 days after surgery (*Table 4*), particularly in the first week. The overall health VAS demonstrated marked improvement from day 1 to day 7 (mean VAS score on day 1: 50 of 100; day 7: 75 of 100), with relatively small further improvements up to day 21 (mean VAS score on day 21: 85 of 100) (*Fig. 3*).

Resource use and cost

The mean number of dressing changes in the first 3 weeks was 13 (range 0–21). Patients reported attending walk-in centres, practice nurse and dressings clinics, and receiving district nurse home visits, with variable experiences regarding the ease with which they were able to access these services. By multiplying relevant observational data with NHS unit costs[25], mean dressing changes and community

Table 4 Quality of life: EQ-5D™ health score profiles

EQ-5D™ component	Time after surgery			
	Day 1	Day 7	Day 14	Day 21
Mobility	2 (1–2)	1 (0–1)	0 (0–1)	0 (0–0·75)
Difficulties with self-care	1(0–2)	1 (0–1)	0 (0–1)	0 (0–0)
Difficulties with usual activities	2 (1–3·5)	1 (0–1·5)	1 (0–1)	1 (0–1)
Pain/discomfort	2 (1–2)	1 (1–1)	1 (0–1)	1 (0–1)
Anxiety/depression	0 (0–1)	0 (0–1)	0 (0–1)	0 (0–1)
Overall health	50 (40–70)	75 (60–90)	85 (70–90)	90 (70–95)

Values are mean (i.q.r.). Each quality-of-life component of the EQ-5D™ is scored between 1 and 5. Overall health is measured using a visual analogue scale.

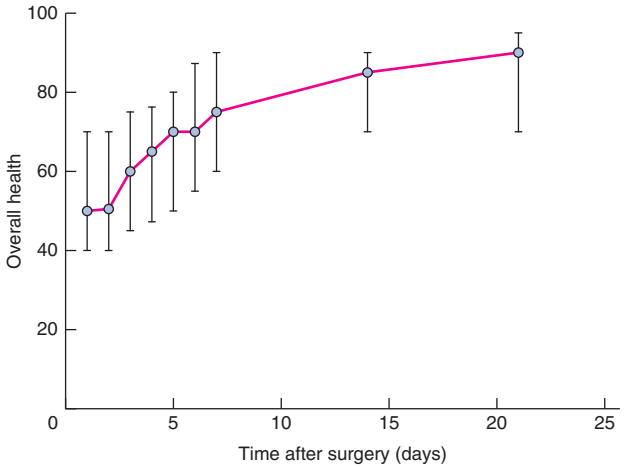

Fig. 3 Overall health scored on a visual analogue scale (0–100 mm) at 1–7, 14 and 21 days. Values are mean (i.q.r.)

nursing costs of €358·52 (£280·80; exchange rate 23 February 2016) per patient were calculated for the 3-week postoperative period alone. This equates to an annual cost of €6 453 360 in England per annum based on 18 000 patients per year[8].

Discussion

Before this observational study, data on management and outcomes in patients with perianal abscesses was based on retrospective case series and two underpowered randomized studies (total 57 patients)[16,17]. Perianal abscesses largely affect young patients of working age, making the population inherently difficult to follow up. Despite these limitations, the present data provide the largest experience of the management of simple primary perianal abscesses.

There was a comparatively low incidence of abscess recurrence at 8 weeks, with high fistula rates observed at 6 months. The previously reported frequency of recurrent or fistulating disease varies widely, from 5 to 37 per cent[5,15,20,26]. As more than one in five patients with a primary perianal abscess in the present study had a fistula *in ano*, it could be considered appropriate to follow up all patients routinely after surgery. All patients who had no epithelialization of the abscess cavity at 8 weeks had either been identified with a fistula or went on to develop a fistula diagnosed at the 6-month follow-up.

Packing of a perianal abscess wound cavity is painful. Some studies[22–24] have sought to translate continuous measures (for example the VAS) into categories such as the verbal rating scale, and have reported VAS scores above 75 mm as 'severe' pain (less than 5 mm as no pain, 5–44 mm as mild pain, 45–74 mm as moderate pain). However, there is a paucity of studies for common acute surgical conditions. The present finding of high levels of severe postoperative pain during dressing changes in the first week after surgery supports the need to prove whether this intervention is of clinical benefit. Analgesic use was not gathered in this study as patient-reported analgesia use is considered unreliable.

There was a marked improvement in all domains of the EQ-5D™, and thus in quality of life, over the 21 days following surgery. The improvement was greatest during the first 7 days. However, even at 14 days there were noticeable limitations to mobility and self-caring, compared with findings at 21 days. Preoperative or baseline scores were not taken, so conclusions cannot be drawn about the effect of either perianal abscess or the incision and drainage on quality of life. EQ-5D™ is a validated assessment tool for assessing quality of life in surgical trials[27]. Overall health scores inversely mirrored the pain scores during pack changes, with the most evident improvement occurring steadily throughout the first 7 days.

The acute and ongoing management of wounds accounts for significant hospital and community resource utilization. Community care is not standardized. The mean number of dressing changes in the first 3 weeks was 13 (range 0–21). This is expensive to the NHS, and equates to an annual cost of €6 453 360 in England per annum based on 18 000 patients per year[8].

Acknowledgements

The Royal College of Surgeons of England provided financial support for the North West Surgical Trials Centre, which provided trial management and data analysis. *Disclosure:* The authors declare no conflict of interest.

References

1 Parks AG. Pathogenesis and treatment of fistuila-*in-ano*. *Br Med J* 1961; **1**: 463–469.
2 Parks AG, Gordon PH, Hardcastle JD. A classification of fistula-*in-ano*. *Br J Surg* 1976; **63**: 1–12.
3 Eisenhammer S. The final evaluation and classification of the surgical treatment of the primary anorectal cryptoglandular intermuscular (intersphincteric) fistulous abscess and fistula. *Dis Colon Rectum* 1978; **21**: 237–254.
4 Goligher JC, Duthie HL, Nixon HH. *Surgery of the Anus, Rectum and Colon*. Ballière Tindall: London, 1980.
5 Hamadani A, Haigh PI, Liu IL, Abbas MA. Who is at risk for developing chronic anal fistula or recurrent anal sepsis after initial perianal abscess? *Dis Colon Rectum* 2009; **52**: 217–221.
6 Nelson RL, Prasad ML, Abcarian H. Anal carcinoma presenting as a perirectal abscess or fistula. *Arch Surg* 1985; **120**: 632–635.
7 Whiteford M. Perianal abscess/fistula disease. *Clin Colon Rectal Surg* 2007; **20**: 102–109.
8 Health and Social Care Information Centre. *Hospital Episode Statistics, Admitted Patient Care – England, 2011–2012*. http://www.hscic.gov.uk/hes [accessed 1 October 2014].
9 Beck DE, Fazio VW, Lavery IC, Jagelman DG, Weakley FL. Catheter drainage of ischiorectal abscesses. *South Med J* 1988; **81**: 444–446.
10 Isbister WH. A simple method for the management of anorectal abscess. *Aust N Z J Surg* 1987; **57**: 771–774.
11 Kyle S, Isbister WH. Management of anorectal abscesses: comparison between traditional incision and packing and de Pezzer catheter drainage. *Aust N Z J Surg* 1990; **60**: 129–131.
12 Ellis M. Incision and primary suture of abscesses of the anal region. *Proc R Soc Med* 1960; **53**: 652–653.
13 Read DR, Abcarian H. A prospective survey of 474 patients with anorectal abscess. *Dis Colon Rectum* 1979; **22**: 566–568.
14 Tang CL, Chew SP, Seow-Choen F. Prospective randomized trial of drainage alone *vs*. drainage and fistulotomy for acute perianal abscesses with proven internal opening. *Dis Colon Rectum* 1996; **39**: 1415–1417.
15 Vasilevsky CA, Gordon PH. The incidence of recurrent abscesses or fistula-*in-ano* following anorectal suppuration. *Dis Colon Rectum* 1984; **27**: 126–130.
16 Tonkin DM, Murphy E, Brooke-Smith M, Hollington P, Rieger N, Hockley S *et al.* Perianal abscess: a pilot study comparing packing with nonpacking of the abscess cavity. *Dis Colon Rectum* 2004; **47**: 1510–1514.
17 Perera AP, Howell, AM, Sodergren MH, Farne H, Darzi A, Purkayastha S *et al.* A pilot randomised controlled trial evaluating postoperative packing of the perianal abscess. *Langenbecks Arch Surg* 2015; **400**: 267–271.
18 Kehlet H, Jensen TS, Woolf CJ. Persistent postsurgical pain: risk factors and prevention. *Lancet* 2006; **367**: 1618–1625.
19 Lohsiriwat V, Yodying H, Lohsiriwat D. Incidence and factors influencing the development of fistula-*in-ano* after incision and drainage of perianal abscesses. *J Med Assoc Thai* 2010; **93**: 61–65.
20 Ramanujam PS, Prasad ML, Abcarian H, Tan AB. Perianal abscesses and fistulas. A study of 1023 patients. *Dis Colon Rectum* 1984; **27**: 593–597.
21 The R Foundation. *The R Project for Statistical Computing*. http://www.R-project.org [accessed 1 September 2015].
22 Boonstra AM, Schiphorst Preuper HR, Balk GA, Stewart RE. Cut-off points for mild, moderate, and severe pain on the visual analogue scale for pain in patients with chronic musculoskeletal pain. *Pain* 2014; **155**: 2545–2550.
23 Hawker GA, Mian S, Kendzerska T, French M. Measures of adult pain: visual analog scale for pain (VAS Pain), numeric rating scale for pain (NRS Pain), McGill Pain Questionnaire (MPQ), Short-Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Grade Scale (CPGS), Short Form-36 Bodily Pain Scale (SF-36 BPS), and Measure of Intermittent and Constant Osteoarthritis Pain (ICOAP). *Arthritis Care Res (Hoboken)* 2011; **63**(Suppl 11): S240–S252.
24 Jensen MP, Chen C, Brugger AM. Interpretation of visual analog scale ratings and change scores: a reanalysis of two clinical trials of postoperative pain. *J Pain* 2003; **4**: 407–414.
25 Personal Social Services Research Unit. *Unit Costs of Health and Social Care 2014*. http://www.pssru.ac.uk/project-pages/unit-costs/2014/ [accessed 1 September 2015].
26 Malik AI, Nelson RL, Tou S. Incision and drainage of perianal abscess with or without treatment of anal fistula. *Cochrane Database Syst Rev* 2010; (**7**)CD006827.
27 Ribaric G, D'Hoore A, Schiffhorst G, Hempel E; TRANSTAR Registry Study Group. STARR with CONTOUR® TRANSTAR device for obstructed defecation syndrome: one-year real-world outcomes of the European TRANSTAR registry. *Int J Colorectal Dis* 2014; **29**: 611–622.