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ORIGINAL ARTICLE

The distribution of the anal glands and the variable regional occurrence of fistula-in-ano: is there a relationship?

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Abstract
Background Fistula in ano is a rather common condition, but the disease process is not yet fully understood. The aim of our study was to determine how the distribution of anal glands contributes to the variable occurrence of fistula-in-ano in the perineum.
Methods we conducted a blinded two-phase prospective study. In the first phase, the perineum of the patients with primary fistulae was anatomically divided into right upper and lower and left upper and lower quadrants in the lithotomy position. The fistulae were classified according to what quadrant the external and internal openings and the tract pathway were in. In the second phase, using 10 human cadaver specimens, full thickness tissue samples were taken from each quadrant of the anus. Samples were histologically evaluated for the volume fractions of the anal glands in each quadrant.
Results The new classification system we propose revealed that the largest number of fistulae 43% (17/39) were in the right lower quadrant, and 22% (9/39), 12% (5/39) and 8% (3/39) were in the left lower, right upper and left upper quadrants, respectively. It was also observed that 14% (5/39) of fistulae were in more than one quadrant. The volume fractions of each quadrant showed that the largest volume fraction of the anal glands was in the right lower quadrant (right lower quadrant: 0.64, left lower quadrant: 0.35, right upper quadrant: 0.26 and left upper quadrant: 0.22, $P = 0.001$).
Conclusions To the best of our knowledge, this is the first study that has objectively shown that the distribution of the anal glands is variable, and the highest density of anal glands is in the right lower quadrant of the anus. This variable distribution may be associated with the variable occurrence in fistula in ano.

Keywords Fistula-in-ano · Anal glands · Classification · Perineum

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Introduction

Fistula-in-ano is a fairly common condition encountered in general surgical or coloproctological practice. The earliest reference to surgical classification and therapy for fistulous disease was made by Hippocrates [1–3]. Louis the XIV was treated for an anal fistula, and the fistulous pathway was correctly identified and successfully treated [1–4]. Although John Arderne (1307–1390) described the anatomy of fistulae, fistulotomy and seton use [1, 2], more objective scientific work was started only in the late 19th and early 20th centuries by prominent clinicians such as Goodsall, Miles, Milligan and Morgan [1–4]. Thompson and Lockhart-Mummery made substantial contributions to theories on pathogenesis and classification of fistulae-in-ano [1–5]. The classification system refined by Alan Parks in 1976 is still being used in clinical practice. Since then, very little has changed in the understanding of the disease process, classification and treatment [1].