Abnormalities detected on digital rectal examinations in dogs are common and influence diagnostic and treatment plans

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OBJECTIVE
To determine the frequency of abnormal findings on digital rectal examination (DRE) performed during physical examinations at a tertiary referral veterinary hospital, to establish what abnormal findings are most common and whether they impact diagnostic and treatment plans, and to assess whether patient signalment or admitting service influences the frequency of abnormalities.

ANIMALS
Client-owned dogs (n = 440).

METHODS
Veterinarians performed DREs on dogs as part of a physical examination. Patient signalment and DRE findings were recorded in a standardized survey. Findings were deemed normal or abnormal and described. Whether the findings changed the diagnostic or treatment plan was also recorded.

RESULTS
Abnormalities were detected on DRE in 160 of 440 (36%) dogs. Changes to the diagnostic plan occurred in 41 of 160 (26%) cases when an abnormality was found. Changes to the treatment plan occurred in 20 of 160 (12.5%) cases when an abnormality was found. Age (P = .2), sex (P = .9), and breed (P = 1) did not significantly influence the frequency of abnormal findings. Abnormal findings were significantly more common in dogs presenting to the emergency service than elective services (P = .005).

CLINICAL RELEVANCE
Among dogs presenting to a tertiary veterinary hospital, abnormalities found on DRE are common and change the diagnostic plan in 1 out of 4 dogs and treatment plan in 1 out of 8 dogs. This study supports the continued practice of DREs in dogs, especially in emergency settings, regardless of signalment.

Keywords: prostatic disease, canine, physical examination, digital rectal examination, neoplasia
by many dogs due to pain, discomfort, or temperament. Less than 50% of experts in 1 study1 felt that a DRE should be performed on any size dog, while 62% believed they should be done on large-breed dogs. Moreover, owners may express reticence around the invasiveness of the examination. While a few studies have been done to assess the utility of DRE for the diagnosis of specific diseases, a comprehensive study assessing the utility of DRE as part of the standard physical examination of dogs has not been reported, to the authors’ knowledge.

The objectives of this study were to assess the frequency in which abnormal findings are appreciated on DRE performed during a physical examination in dogs presenting to a university veterinary hospital. Additionally, the study aimed to determine what abnormal findings are most common, the frequency at which specific findings impact diagnostic and treatment plans, and whether patient signalment or presenting service significantly influence whether an abnormality is more likely to be found. We hypothesized that abnormal DRE findings are common, especially in older male dogs, but do not as commonly influence diagnostic and treatment plans.

Methods

Dogs of any signalment were included if they had a DRE performed as a part of their physical examination. DREs were performed at least once by the veterinarian submitting the survey but may have been performed additionally by students or other veterinarians at different time points. No discrimination was made as to the presenting complaint or the service that evaluated the dog. All results were submitted through a clinical survey. The clinical survey was developed via Word (Microsoft Corp) and widely distributed on paper in a tertiary veterinary referral hospital between May 2022 and May 2023. The clinical surveys were located in the emergency room, specialty service round rooms, and high-traffic areas including medical record distribution areas and the pharmacy. Only clinical surveys with a veterinarian’s signature were included in the data collection. No informed client consent was obtained since the DRE is considered a standard of care for dogs presenting to the hospital, and clinician discretion was used on whether to perform a DRE on an individual dog.

Data collected included date of presentation, evaluating service, signalment, and ranked problem list by the clinician performing the DRE, based on history and presenting complaint. In the case of a routine wellness examination, “wellness” was denoted as problem number 1. Anatomical components of the DRE were broken down into the following categories: rectal contents, prostate, pelvic floor and urethra, anal sacs, rectal wall, and sublumbar lymph nodes. Each aspect was denoted on the survey as “normal,” “abnormal,” or “N/A,” which indicated that a structure was not present in the patient (prostate in female dogs) or not palpated and therefore could not be evaluated. A comment section was available for each category to describe any abnormal findings if present.

Two follow-up questions were included in the clinical survey: “Are you pursuing further diagnostics based on the rectal examination findings?” and “Did you change your initial treatment plan based on rectal examination findings?” The answers to these questions were marked as either “no” or “yes,” and if the answer was “yes,” a brief explanation was required in the comments section.

The results were coded into an Excel spreadsheet via Microsoft Forms (Microsoft Corp). The questions on the paper survey matched those on the Microsoft Form exactly. The problem list for each dog was coded on the basis of the chief complaint and its associated body system: GI, genitourinary, musculoskeletal, neurologic, cardiology, or respiratory. Chief complaint was identified as the most life-threatening problem delineated on the problem list and identified during data collection. If it was deemed that there was > 1 chief complaint based on the body system, the chief complaints were categorized as “mix.” If the chief complaint was not related to the aforementioned body systems, it was categorized as “other.” Admitting hospital services were coded as emergency or elective services after data collection, and elective services were categorized as surgical (soft tissue surgery, surgical oncology, orthopedic surgery) or medical (internal medicine, medical oncology, primary care, dermatology).

Categorical variables are reported as counts and percentages. Age was not normally distributed as determined visually and by the skewness and kurtosis tests and is therefore reported as median (range). The 2-sample Wilcoxon rank sum (Mann-Whitney) test was used to determine whether there was a difference in median age between dogs with and without an abnormality detected on DRE. The χ² or Fisher exact test was utilized to determine the relationship between 2 categorical variables, depending on whether the frequency of observations per cell was ≥ 5, and determine whether significant differences were present between dogs of specific categorical groups. When a categorical variable (such as service category) had > 2 categories, the Bonferroni correction was applied, and Bonferroni-corrected P values are reported. A P value < .05 was considered significant for all tests. All statistical evaluations were performed using a statistical software package (Stata for Mac, version 14.0; Stata Corp).

Results

Four hundred forty dogs that underwent a DRE were included in the study. Of these, 180 of 440 (41%) were spayed females, 169 (38%) were castrated males, 58 (13%) were intact males, and 33 (8%) were intact females. The distribution of normal and abnormal DRE findings by sex is presented in Table 1.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Normal DRE</th>
<th>Abnormal DRE</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>FI</td>
<td>22 (67%)</td>
<td>11 (33%)</td>
<td>33</td>
</tr>
<tr>
<td>FS</td>
<td>117 (65%)</td>
<td>63 (35%)</td>
<td>180</td>
</tr>
<tr>
<td>MI</td>
<td>37 (64%)</td>
<td>21 (36%)</td>
<td>58</td>
</tr>
<tr>
<td>MC</td>
<td>104 (62%)</td>
<td>65 (38%)</td>
<td>169</td>
</tr>
</tbody>
</table>

FI = Intact female. FS = Spayed female. MC = Castrated male. MI = Intact male.
Discussion

Our study found that abnormal DRE findings are commonly diagnosed in a tertiary referral veterinary hospital, with almost 40% of dogs having at least 1 abnormal finding on a DRE.

Historically, most of the research done about the utility of DRE has been focused on abnormalities more common to males (eg, prostatic disease, perianal hernias).2,3,6 There is evidence to support that specific abnormalities found on DRE such as perineal hernias

Table 2—Frequency of DRE abnormalities in 440 dogs presented to a university veterinary hospital grouped by median age and comparison of age between normal and abnormal groups using a 2-sample Wilcoxon rank sum (Mann-Whitney) test; \( P = .2 \).

<table>
<thead>
<tr>
<th>Findings</th>
<th>No. of dogs</th>
<th>Median (range) age (y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal DRE</td>
<td>280 (64%)</td>
<td>6.9 (0.3–17.7)</td>
</tr>
<tr>
<td>Abnormal DRE</td>
<td>160 (36%)</td>
<td>7.2 (0.2–15.8)</td>
</tr>
<tr>
<td>Total</td>
<td>440</td>
<td>7.1 (0.2–17.7)</td>
</tr>
</tbody>
</table>

Table 3—Frequency of DRE abnormalities in 440 dogs presented to a university veterinary hospital grouped by breed and comparison of frequency of abnormalities among purebred and mixed-breed dogs using a \( \chi^2 \) test and Bonferroni correction; \( P = 1 \).

<table>
<thead>
<tr>
<th>Breed</th>
<th>Normal DRE</th>
<th>Abnormal DRE</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed breed</td>
<td>123 (64%)</td>
<td>70 (36%)</td>
<td>193</td>
</tr>
<tr>
<td>Purebred</td>
<td>157 (64%)</td>
<td>90 (36%)</td>
<td>247</td>
</tr>
</tbody>
</table>

Table 4—Frequency of DRE abnormalities in 440 dogs presented to a university veterinary hospital grouped by chief complaint.

<table>
<thead>
<tr>
<th>Chief complaint</th>
<th>Normal DRE</th>
<th>Abnormal DRE</th>
<th>Total dogs with chief complaint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastrointestinal</td>
<td>85 (52%)</td>
<td>79 (48%)</td>
<td>164</td>
</tr>
<tr>
<td>Genitourinary</td>
<td>35 (65%)</td>
<td>19 (35%)</td>
<td>54</td>
</tr>
<tr>
<td>Musculoskeletal</td>
<td>45 (68%)</td>
<td>21 (32%)</td>
<td>66</td>
</tr>
<tr>
<td>Neurological</td>
<td>10 (77%)</td>
<td>3 (23%)</td>
<td>13</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>5 (83%)</td>
<td>1 (17%)</td>
<td>6</td>
</tr>
<tr>
<td>Respiratory</td>
<td>20 (83%)</td>
<td>4 (17%)</td>
<td>24</td>
</tr>
<tr>
<td>Mix</td>
<td>9 (47%)</td>
<td>10 (53%)</td>
<td>19</td>
</tr>
<tr>
<td>Other</td>
<td>71 (76%)</td>
<td>23 (24%)</td>
<td>94</td>
</tr>
</tbody>
</table>

Mix = More than 1 chief complaint based on the affected body systems. Other = The chief complaint was not related to the listed body systems.

Table 5—Frequency of DRE abnormalities presented to a university veterinary hospital grouped by admitting service using a \( \chi^2 \) test and Bonferroni correction; \( P = .005 \).

<table>
<thead>
<tr>
<th>Findings</th>
<th>Emergency service</th>
<th>Elective services</th>
<th>All services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal DRE</td>
<td>131 (47%)</td>
<td>149 (53%)</td>
<td>280</td>
</tr>
<tr>
<td>Abnormal DRE</td>
<td>97 (61%)</td>
<td>63 (39%)</td>
<td>160</td>
</tr>
<tr>
<td>Total</td>
<td>228 (52%)</td>
<td>212 (48%)</td>
<td>440</td>
</tr>
</tbody>
</table>

The median age of dogs in this study population was 7.1 years (range, 0.2 to 17.7 years). Distribution of age among dogs with and without DRE abnormalities is presented in Table 2. One hundred ninety-three of 440 (44%) dogs in this study population were mixed breed, and 247 (56%) were purebred. Distribution of breeds among dogs with and without DRE abnormalities is presented in Table 3. There was no significant association between the signalment factors of sex \( (P = .9) \), age \( (P = .2) \), and mixed or purebred dogs \( (P = 1) \) and frequency of abnormalities on DRE.

Distribution of clinical signs/chief complaints and presenting hospital services among dogs in the study are presented in Tables 4 and 5, respectively. Of the chief complaints, the most common across all services was GI signs in 164 of 440 (37%) cases. Two hundred twenty-eight of 440 (52%) dogs presented to the emergency service, while 212 (48%) presented to elective services, of which 174 (82%) presented to medicine services (internal medicine, dermatology, primary care, medical oncology) and 38 (18%) presented to surgery services (orthopedics, soft tissue surgery, surgical oncology). Significantly more abnormalities were found on DRE in dogs presented to the emergency service compared to elective services \( (P = .005) \).

Abnormal DRE findings were noted in 160 of 440 (36.4%) dogs. The frequency of specific DRE abnormalities, as well as frequencies of change in diagnostic and therapeutic plans based on DRE findings for each anatomic category assessed are listed in Table 6. Ten of the 19 (53%) male dogs with documented abnormal DRE findings related to the prostate gland were intact. The description of the abnormal findings in 4 of these 10 (40%) dogs was consistent with changes associated with benign prostatic hyperplasia, and in 1 of these 4 (25%) a change to the diagnostic plan was documented.

Table 6—Frequency of DRE abnormalities in 440 dogs presented to a university hospital grouped by anatomic category assessed are listed in Table 2. One hundred ninety-three of 440 (44%) dogs in this study population were mixed breed, and 247 (56%) were purebred. Distribution of breeds among dogs with and without DRE abnormalities is presented in Table 3. There was no significant association between the signalment factors of sex \( (P = .9) \), age \( (P = .2) \), and mixed or purebred dogs \( (P = 1) \) and frequency of abnormalities on DRE.

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Discussion

Our study found that abnormal DRE findings are commonly diagnosed in a tertiary referral veterinary hospital, with almost 40% of dogs having at least 1 abnormal finding on a DRE.

Historically, most of the research done about the utility of DRE has been focused on abnormalities more common to males (eg, prostatic disease, perianal hernias).2,3,6 There is evidence to support that specific abnormalities found on DRE such as perineal hernias
are more common in male dogs, specifically intact male dogs.\textsuperscript{5} Similarly, the incidence of abnormalities such as benign prostatic hypertrophy or cancer such as anal sac tumors tends to increase with age.\textsuperscript{7,8} Our study did not find significant differences in the frequency of abnormalities by sex, age, or breed, justifying DRE as part of a physical examination regardless of signalment.

A significantly higher frequency of DRE abnormalities on emergency service as compared with elective services may be attributable to the regular occurrence of abnormalities in rectal contents and high frequency of chief complaints related to GI signs. Examining the character of rectal contents may aid the clinician with refining diagnostic and treatment plans, as evidenced by diagnostic and treatment plan changes of 26% and 8%, respectively, in cases of abnormal rectal contents; therefore, routine DRE in the emergency room is useful.

Interestingly, among chief complaints, the highest frequency of abnormal DRE was found when the chief complaint was described as a “mix,” where >1 body system was implicated. Routine DRE in dogs with problems concerning multiple body systems is supported by our study.

Of the anatomic areas assessed by DRE, abnormal rectal contents represented the most common findings. As previously mentioned, this is likely due to the large percentage of dogs that presented with GI signs as the chief complaint. Anal sac gland abnormalities were also found to be a common DRE finding. Up to 15.7% of dogs in 1 study\textsuperscript{6} were reported to have anal sac abnormalities. In our population, 20% of dogs had abnormalities related to the anal sacs, and as DRE is the most direct way of evaluating the anal sacs, routine DRE evaluation may be a good way to detect and potentially prevent anal sac disease, such as impaction prior to abscessation. In addition, anal gland adenocarcinoma is a neoplasm commonly first diagnosed via DRE and may not be associated with significant clinical signs early in the disease. A longitudinal study on the utility of DRE in early diagnosis of anal gland adenocarcinoma could be considered in the future.

The frequency of abnormalities related to the prostate gland in our study was 9.5%, which is lower than published studies with a higher population of intact males. One study\textsuperscript{2} found that the frequency of prostatic abnormalities on DRE in a population that included 80% intact male dogs was 46.2%. There are little published data on the frequency of prostatic disease in neutered dogs, although some evidence suggests that neutered males have a 2.84 times higher risk of developing prostate cancer than intact dogs.\textsuperscript{10} While prostatic abnormalities were noted in just under 1 out of 10 males undergoing a DRE in our study population, it is possible that with a higher population of intact males, the percentage of abnormal findings would be different.

Rectal wall, sublumbar lymphadenopathy, and pelvic floor and urethral abnormalities represented a small percentage of abnormal findings identified on DRE. Few studies have published the incidence of these abnormalities in dogs, although perineal hernia has a documented prevalence between 0.1% and 0.4% in dogs.\textsuperscript{6} For perineal hernias, definitive diagnosis depends on rectal examination findings.\textsuperscript{6} Rectal tumors have been recognized as <10% of all tumors in dogs.\textsuperscript{11} However, DREs have a high sensitivity for the diagnosis of rectal tumors, up to 86% in 1 study.\textsuperscript{11} While these abnormalities may represent a small percentage of findings overall, DRE findings are an important tool for their diagnosis.

On the basis of our findings, the abnormalities that most frequently led to changes in the diagnostic or treatment plans were those related to the rectal wall. When rectal wall abnormalities were diagnosed via DRE, additional imaging modalities were likely considered to assess for metastasis and extent of the lesion in the case of a rectal mass or to assess the contents of the hernia.\textsuperscript{12,13} Additionally, in the case of rectal wall masses, rectal wall fistulae, or perineal hernias, treatment is typically recommended as soon as the abnormality is detected on a DRE, which would potentially make exploring those abnormalities a diagnostic priority.\textsuperscript{4,12,13}

In addition, a high frequency of changes to the diagnostic plan occurred when pelvic floor/urethral abnormalities were noted. However, changes to the treatment plan were less frequent with this finding. This is likely because pelvic floor and urethral abnormalities such as palpable fractures of the pelvis or a urethral stone felt on palpation usually require additional diagnostics such as imaging for their complete diagnosis; however, a defined treatment plan is not always determined as soon as the abnormality is found.\textsuperscript{14,15}

High frequency of changes to the diagnostic plans when prostatic abnormalities are present warrants a DRE in all male dogs whenever possible, regardless of neuter status. Prostatic abnormalities frequently warrant further diagnostic steps, especially if they are associated with clinical signs pertaining to the lower urinary tract or those related to prostatic disease.\textsuperscript{5,16} Changes to the treatment plan were less common in the present study, likely because further diagnostic testing was undertaken before a specific treatment plan was determined.

Fewer changes to the diagnostic plan but larger frequency of changes to the treatment plan were documented when abnormalities of the anal sacs were noted. With some commonly diagnosed anal sac abnormalities like impaction, it is likely that some of the treatment plans immediately taken after an abnormality was detected included simple tasks such as expression of the anal sac.\textsuperscript{4,7,9}

There were several limitations of this study. First was the subjective nature of the survey, as clinicians could mark findings as normal or abnormal, as well as how the findings changed the diagnostic or therapeutic plan, depending on their clinical opinion. No specific training was done among veterinarians before this study was conducted, which may have contributed to heterogeneity of the results, as DRE is considered to be part of a routine physical examination in veterinary medicine.\textsuperscript{3} For example, for some clinicians, findings
consistent with benign prostatic hyperplasia were still considered to be abnormal and may occasionally have led to changes in the diagnostic plan. It is also possible that the DRE algorithm and findings could have differed depending on the expertise of the individual clinician, confounding the results. Because of the nature of a tertiary referral hospital, the population and results yielded from this study may be different from a similar population presenting to a primary care facility. Moreover, about half of the cases included in this study presented through the emergency service and, therefore, results may be different from another population in a less emergent setting. As enrollment of cases was voluntary, proportions of cases enrolled by various services could have biased the results. Because of the voluntary nature of the survey and number of services involved in this study, a response rate for the survey could not be estimated. On the basis of the nature of the survey, which specific abnormality on DRE was responsible for the change in the diagnostic and treatment plan was not elucidated, although our data analysis revealed that most of the anatomic abnormalities were significantly associated with a change in the diagnostic plan when present, compared to when they were not present. Lastly, we documented low numbers of dogs with abnormal findings like pelvic floor and rectal wall abnormalities and sublumbar lymphadenopathy, so type 2 error may have confounded our results and conclusions.

Possible future directions include larger prospective studies investigating which signalment factors and presenting complaints in combination (for example an older, male dog presenting with urinary signs) may make a DRE significantly more useful and therefore most important to perform. Additionally, a prospective randomized case-control study could investigate how DRE performance may influence diagnostic and treatment decision, as well as outcomes in clinical patients.

Findings from our study suggest that changes in diagnostic and therapeutic plans occur frequently enough to support the continued use of DRE in dogs in emergency practice and possibly elective referral practices, regardless of signalment. While rectal content abnormalities are most common, specific attention should be put toward assessment of the rectal wall, pelvic floor and urethra, and anal sacs, as these findings are most closely associated with changes to the diagnostic and/or treatment plans.

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**References**