

# Routine pathological evaluation of tissue from inguinal hernias in children is unnecessary

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**Introduction:** Because unexpected disease is rare in a child's inguinal hernia sac we decided to investigate the cost of routine pathological evaluation of inguinal hernial sacs in children and the incidence of clinically significant pathological findings. **Methods:** We searched the health records at the University Hospital, Saskatoon, for patients under 20 years of age who had inguinal hernia repair between 1988 and 1997. For records noting pathology findings of duct-like structures, the operative reports and histology slides were reviewed. Specimens were immunostained for muscle-specific actin. The cost of pathological evaluation was estimated using a provincial physician-billing schedule. **Results:** During the study period, there were 488 inguinal hernia repairs in 371 patients under 20 years of age. Of these, 456 (93.4%) specimens were evaluated microscopically. There were 4 (0.88%) cases with unexpected findings diagnosed as epididymis at a cost of Can\$6988/case. **Conclusion:** The routine histologic evaluation of inguinal hernia sacs in children is an unnecessary expense and should be reserved for select cases at the discretion of the surgeon.

**Introduction :** Parce qu'une maladie inattendue est rare dans le sac hernial inguinal d'un enfant, nous avons décidé d'étudier le coût de l'évaluation pathologique de routine du sac hernial inguinal chez les enfants et l'incidence de résultats pathologiques significatifs sur le plan clinique. **Méthodes :** Nous avons étudié les dossiers de santé, à l'Hôpital universitaire de Saskatoon, des patients de moins de 20 ans qui ont subi une résection d'une hernie inguinale entre 1988 et 1997. Dans le cas des dossiers contenant des résultats pathologiques indiquant la présence de structures quasi canalaire, on a étudié les rapports d'intervention et les lames d'histologie. On a soumis les spécimens à une immunocoloration pour détecter l'actine spécifique au muscle. On a estimé le coût de l'évaluation pathologique en fonction d'une grille provinciale de facturation des médecins. **Résultats :** Au cours de la période d'étude, 371 patients de moins de 20 ans ont subi 488 résections d'une hernie inguinale. Sur ce total, on a évalué 456 (93,4 %) spécimens au microscope. On a diagnostiqué, dans quatre (0,88 %) cas, des résultats inattendus comme une épididymite, à un coût de 6988 \$CAN par cas. **Conclusion :** L'évaluation histologique de routine du sac hernial inguinal chez les enfants est une dépense inutile et il faudrait la réserver à certains cas choisis à la discrétion du chirurgien.

It is common practice to send tissue from a hernia sac for pathological evaluation, although in children unexpected disease is rare and is almost exclusively limited to genital duct structures. This practice was challenged in 1998 by 2 reports,<sup>1,2</sup> from pediatric hospitals, demonstrating that it of-

fered little relevant clinical information. We embarked on a 10-year review of inguinal hernia repairs in children at a university teaching hospital to determine the incidence of abnormal pathological findings in hernias repaired by general surgeons and urologists. Furthermore, we sought to

determine the cost of this practice.

We hypothesize that there is no clinical justification for the routine pathological examination of tissue from inguinal hernia sacs in children and that omitting this practice would result in significant cost savings with no harm to patients.

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## Patients and methods

We searched the health records of the Royal University Hospital, Saskatoon, for inguinal hernias in children under 20 years of age repaired between 1988 and 1997. Pathology reports noting abnormalities were identified. Reports of embryonic remnant, epididymis, vas deferens or Mullerian duct remnant were selected for review. Findings considered not clinically significant included chronic inflammation, fibrosis and adrenal cortical rests. We examined the operative reports, and 2 independent pathologists reviewed the histology slides. All tissues had been fixed in formalin and stained with hematoxylin and eosin. For this study, specimens were additionally stained with Masson trichrome (MT) and immunoperoxidase for muscle-specific actin (MSA). The diameter of the duct-like structures was measured with an ocular micrometer at 4× objective power.

A duct-like structure was considered to be vas deferens or epididymis if it was lined by pseudostratified columnar epithelium and surrounded by smooth muscle as demonstrated by MT stain or a continuous MSA staining band. In the absence of these features the duct-like structures were considered to be embryonic remnants.<sup>3-5</sup>

The Saskatchewan Department of Health Medical Services Plan (MSP) reported the number of billing submissions for inguinal hernia repair in patients under the age of 20 years for the years 1990–1999 inclusive. We used the 1996 MSP fee codes to calculate the cost of pathological evaluation.

## Findings

There were 488 hernia repairs in 371 children; in 117 children the repairs were bilateral. The mean age (and standard deviation) was 2.1 (0.3) years. Of the 371 children, 325 (87.6%) were male. There were 456 pathology specimens (93.4%). Five

reports (1.1%) referred to duct-like or gland-like structures. They all contained pseudostratified columnar epithelium and microvilli. Four children, aged 1, 3, 4 and 6 months were found to have collections of multiple small (average diameter 0.2 mm) ducts (Fig. 1). A thin wall of smooth muscle surrounding the ducts was only seen with MSA. Both pathologists diagnosed these as epididymis. The fifth specimen, from the 3-year-old child, was diagnosed as vas deferens with a solitary large (0.7-mm) duct and a prominent smooth-muscle coat.

The operations were done by 20 general surgeons and 7 urologists. Five surgeons accounted for 312 repairs (63.9%) and 4 of the 5 abnormal reports. The operative records indicated that the vas deferens injury was suspected at the time of surgery. The 4 cases of epididymis were unexpected findings, and in each case there was an associated communicating hydrocele, which was resected.

The MSP reported billing submissions for 4303 hernia repairs in patients less than 20 years of age, accounting for 0.14% of the Saskatchewan population in that age group.<sup>6</sup> The fee for pathological eval-

uation of a surgical specimen in Saskatchewan for 1996 was \$53.50 plus \$8.90 for specimen preparation for a total of \$62.40 per specimen.<sup>7</sup> If it can be assumed that all operations might result in the submission of tissue for pathological evaluation, the estimated total cost for pathological evaluation of pediatric inguinal hernia sacs in Saskatchewan for a 10-year period (1990–1999) would be Can\$268 507 or Can\$26 851/year. Considering a 0.88% incidence of unexpected clinically significant disease, the cost to detect a single case would be Can\$6988.

## Discussion

Inguinal hernia repair in children is usually uncomplicated in the hands of an experienced surgeon. Unexpected abnormality in inguinal hernia sacs in children is exceedingly rare. Ectopic tissues such as adrenal cortical rests and glial implants in patients with ventriculoperitoneal shunts are curiosities occasionally seen, but they are of no clinical significance. Some neoplasms, such as extrarenal Wilms' tumours, lymphomas, sarcomas, as well as vascular neoplasms and fibrous tumours, have rarely been reported to



FIG. 1. Histologic findings of multiple small (0.2-mm) ducts composed of pseudostratified columnar epithelium with microvilli and surrounded by a narrow wall of smooth muscle (hematoxylin-eosin; original magnification ×10).

occur in the inguinal area in children but not as occult findings within hernia sacs.<sup>8</sup> The unexpected finding of malignant disease occurs in less than 1% of adult hernia sacs and no such series has been reported in children.<sup>9</sup>

A 0.33%–1.6% incidence of vas deferens injury has been reported.<sup>3,10</sup> The histologic interpretation of ductal structures found incidentally in hernia sacs is challenged by misinterpretation of duplicated vas deferens<sup>11</sup> and Mullerian duct remnants.<sup>3,4,12,13</sup> These remnants typically appear as small duct-like structures that are composed of ciliated low columnar cells interspersed with occasional pale round cells but no definite muscle coat. The duct diameter ranges from 0.07–0.20 mm, and they occur in small groups or large clusters. Vas deferens, on the other hand, has an overall diameter of approximately 1 mm and a very prominent muscle coat. Epididymis has a diameter of 0.2–0.3 mm, similar to that of Mullerian remnants. The presence of a thin band of smooth muscle surrounding the duct-like structures suggests epididymis rather than embryonic remnant, but this may be difficult to appreciate and is not uniformly accepted.<sup>3-5</sup>

In this study there were 4 cases of suspected epididymis, each associated with the resection of a communicating hydrocele. There is controversy over the appropriate management of a communicating hydrocele. Many surgeons excise or repair the hydrocele whereas others advocate conservative management by either no intervention or simply incising the sac opposite the reproductive structures.<sup>14</sup> Our findings reinforce the argument for conservative treatment.

An option to routine histologic examination is gross examination only, selecting specimens for histologic examination based on the gross findings. This practice has not been validated and places a burden on the pathologist to decide, without direct clinical experience, which specimens should be examined microscopically.

An argument can be made for preserving tissue in paraffin blocks so that it can be evaluated later if some related clinical issue arose. However, the value of this practice would have to be questioned in light of the low incidence of clinically significant pathologic findings. Although the cost of histologic examination may be saved, the processing and preservation of tissues requires significant resources. In some cases it may be more than 20 years before reproductive issues are raised. Furthermore, it is generally agreed that injuries to reproductive structures are as likely to occur from handling tissue as from actually resecting a portion of vas deferens or epididymis.

It is a common misconception that there is a legal requirement to submit all resected tissues for pathological examination. In Saskatchewan there is no such legislation. Some hospital by-laws provide guidance in this regard, but others do not. The Saskatoon Regional Health Authority leaves the decision to the surgeon.

Routine histologic evaluation of tissue from inguinal hernia sacs in children does not, as typically practised, lend itself to surgical or pathological quality assurance. There is a need for quality assurance programs; however, they should specifically be designed to be effective in identifying, documenting and reviewing for improvement the processes involved whether they are part of the pathological evaluation or the operative technique.

This study is limited by its retrospective nature. Abnormal findings may have been overlooked, although the incidence in this study is within the same range as in other studies, suggesting reasonable consistency.

In conclusion, it is common practice to do routine histologic evaluation of tissue from inguinal hernia sacs in children. Unexpected, potentially clinically significant, disorders were found in 0.88% of specimens at a cost of \$6988/case. This examination is probably not justified, as the accuracy of current techniques to differentiate epididymis from embryonic tissues is

unclear. The conservative management of an associated communicating hydrocele should be advocated and may reduce this incidence.

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