

6	<p>【診察室】</p> <ul style="list-style-type: none"> ・さらにやりとり 	<p>〈伊藤さん〉最近、軽い頭痛がするのですが、このせいでしょうか？</p> <p>〈医師〉いいえ、この動脈瘤から出血すればかなり強い頭痛がするはずですから、今のところ直接は関係ないと思います。</p> <p>〈伊藤さん〉ホームページで見たら『くも膜下出血』になるかもしれないと書いてあったのですが…。</p> <p>〈医師〉『脳動脈瘤』が破裂すると『くも膜下出血』になります。ではもう少し詳しくお話ししましょう。</p>
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2：未破裂脳動脈瘤とは

2-1：脳の構造と脳動脈瘤

7	<p>【CG：脳の構造・正常】</p> <ul style="list-style-type: none"> ・頭部が透けて頭蓋骨が見える ・さらに頭蓋骨が透けて脳へ ・脳の断面 [硬膜][くも膜][軟膜] ・さらに脳の裏側の血管網を見る 	<p>〈N〉まず脳の構造を見てみましょう。</p> <p>〈N〉脳は外側から、『硬膜』『くも膜』『軟膜』でおおわれています。</p> <p>〈N〉『くも膜』と『軟膜』の間の空間を『くも膜下腔』といい、脳脊髄液で満たされています。</p> <p>〈N〉ここに沢山の血管が走っています。</p>
8	<p>【CG：脳の構造・病態】</p> <ul style="list-style-type: none"> ・[脳動脈瘤]を示す 	<p>〈N〉この動脈の一部が膨らんだものが『脳動脈瘤』です。</p>

1 1	<ul style="list-style-type: none"> ・ [ドーム] を図示 ・ [ネック] を図示 ・ [ブレブ] を図示 <p>【CG：出血→くも膜下出血】</p> <ul style="list-style-type: none"> ・ 破裂してくも膜下腔に出血 	<p>〈N〉 動脈瘤の入り口を「ネック」、膨らんだ部分を「ドーム」と呼びます。</p> <p>〈N〉 「ドーム」の一部が突出したところを「ブレブ」と呼び、ここは特に壁が薄く、破れやすい場所とされています。</p> <p>〈N〉 そしてこの動脈瘤が破裂してくも膜下腔に出血が広がったのが『くも膜下出血』です。</p>
2-2：未破裂脳動脈瘤の疫学と臨床像		
1 2	<p>【くも膜下出血の症状】</p> <ul style="list-style-type: none"> ・ 経験したことのない激しい頭痛 ・ 吐気、嘔吐 ・ 意識障害 ・ 片麻痺などの局所症状（稀） 	<p>〈N〉 『くも膜下出血』になると、「激しい頭痛」「吐気や嘔吐」「意識障害」などの症状が起こり、出血量が多い場合、命に関わることになります。</p>
1 3	<p>【写真：CT】</p> <ul style="list-style-type: none"> ・ 脳血管攣縮 ・ 出血後、数週間にわたって血管が細くなり脳梗塞にいたる。 ・ 水頭症 ・ 出血から 1~2 ヶ月後に脳脊髄液の吸収が障害される。 	<p>〈N〉 さらに出血後に数週間にわたり血管が細くなり脳梗塞にいたる『脳血管攣縮』や、出血 1-2 ヶ月後に脳脊髄液の吸収が障害されて『水頭症』が起こることもあります。</p>
1 4	<p>【円グラフ：くも膜下出血の予後】</p> <ul style="list-style-type: none"> ・ [社会復帰 20—30%] ・ [後遺症 30—40%] ・ [死亡 30—40%] 	<p>〈N〉 出血の程度によって予後は大きく変わりますが、社会復帰できる人が全体の 20 から 30%。麻痺や言語障害、認知障害などの後遺症が残る人が約 30 から 40%。そして 30 から 40% の人は死に至ります。</p>

15	<p>【くも膜下出血の可能性と要因】</p> <ul style="list-style-type: none"> ・[大きさ][形状][部位][くも膜下出血歴][家族歴] 	<p>〈N〉出血の可能性については『動脈瘤』の「大きさ」「形状」「部位」「くも膜下出血歴」「家族歴」「(年齢)」などによって大きく変わることが報告されています。</p>
19	<p>【診察室】</p> <ul style="list-style-type: none"> ・質問する伊藤さん ・医師の返事 	<p>〈伊藤さんの妻〉どのような治療方法があるのでしょうか？</p> <p>〈医師〉では治療法についてご説明します。</p>

3：未破裂脳動脈瘤の治療法

未破裂脳動脈瘤の治療法		
20a	<p>【タイトル】</p> <ul style="list-style-type: none"> ・[開頭術] ・[血管内手術] ・[経過観察] <p>→開頭術の文字のみ残し次へ</p>	<p>〈N〉脳動脈瘤の治療法には、「開頭術」「血管内手術」「経過観察」の3つの方法があります。</p>
3-1：〈コーナータイトル〉開頭術・		
20	<p>【CG：開頭術の手順】(東大)</p> <ul style="list-style-type: none"> ・頭部全体を見る ・皮膚を切開 ・頭蓋骨を外す ・治療具の通り道を示す(顕微鏡手術) 	<p>〈N〉従来より行われてきた方法として開頭術があります。これは動脈瘤の根元をクリップで留めて出血を防ぐ方法です。</p> <p>〈N〉開頭術では頭部の皮膚を切開して頭蓋骨の一部を一時的に外します。</p> <p>〈N〉次に硬膜を開き、手術用顕微鏡を使って、脳の隙間からくも膜下腔を通り脳動脈瘤に到達します。</p>

	<ul style="list-style-type: none"> ・動脈瘤に到達 ・クリップをかける ・ドームの色が変わる
<p>2 3 【B G : 手術室】 治療困難な例 [部位 深部にあるもの] [大きさ 大きい] [形状 ネットの幅が広い]</p>	<p>〈N〉そこで脳動脈瘤のネックに金属のクリップをかけて正常の脳動脈から遮断分離します。これにより脳動脈瘤からの出血率をゼロに近く低下させることができます。</p> <p>〈N〉開頭術には一定の技術が必要とされ、動脈瘤が深くにある場合や、大きさが大きいもの、ネックが幅広いものなどは、脳虚血や脳損傷などのリスクも高くなります。</p>
<p>2 4 【合併症の種類】</p> <p>◆開頭術に伴う合併症</p> <p>〈1〉手術手技に関するもの 〈2〉手術部位に関するもの 〈3〉全身麻酔、使用薬剤に関するもの 〈4〉その他</p> <p>〈1〉手術手技に関するもの [脳/神経の損傷や痙攣] [血管閉塞/血管損傷] [髄膜炎などの感染症]</p> <p>〈2〉手術部位に関するもの [片麻痺] [言語障害]</p> <p>〈3〉全身麻酔、使用薬剤に関するもの [心臓、肺、腎臓、肝臓などの機能障害]</p> <p>〈4〉その他 [創部のしびれ] [頭皮の陥没]</p>	<p>〈N〉開頭術に伴う合併症としては、手術手技に関するもの、手術部位に関するもの、全身麻酔、使用する薬剤に関するものなどが挙げられます。</p> <p>〈N〉手術手技に関するものとして、手術操作に伴う脳や神経の損傷や痙攣、血管閉塞や血管損傷に伴う脳梗塞や脳出血髄膜炎などの感染症。</p> <p>〈N〉手術部位に関するものとして、部位に関連した症状、例えば片麻痺、言語障害などの神経障害などがあります。</p> <p>〈N〉また、全身麻酔、使用薬剤に関するものとして心臓、肺、腎臓、肝臓などの機能障害。</p> <p>〈N〉その他の合併症として創部のしびれや陥没などの美容上のものや開口障害などがあります。</p>

	<p>[開口障害]</p> <p>2 5 【重篤な合併症の発症率】</p> <ul style="list-style-type: none"> ・ [重篤な神経障害：10% 死亡：1% (Lancet 2003)] ・ [日本では5%以下 (ただし後頭蓋窩では20%)] 	<p>〈N〉 イギリスの医学雑誌・Lancet のデータによると、未破裂脳動脈瘤の開頭術に伴う重篤な運動障害や認知障害は10%程度とされ、1%程度の死亡例もあります。日本からの報告では（このような重篤な障害は<u>5%以下が多いようです。</u></p> <p>〈N〉 この数字は各施設の技量や手術症例の難易度などにより異なると考えられます。</p>
3-2 : 〈コーナータイトル〉 血管内手術		
	<p>2 6 【血管内手術に使う器具】</p> <ul style="list-style-type: none"> ・ 手術の様子 ・ [血管内手術用カテーテル] ・ プラチナコイルが出る <p>2 7 【CG : 血管内手術の手順】</p> <ul style="list-style-type: none"> ・ 全身像：大動脈からカテーテルを挿入し患部への通り道を示す ・ 動脈瘤にプラチナコイルが入っていく <p>2 8 【血管内手術の完全閉塞率】</p> <ul style="list-style-type: none"> ・ ドームが小さくネックが狭いー90%以上 ・ ドームが大きくネックが広いー50%程度 <p>(JNS98:959-966, 2003)</p>	<p>〈N〉 最近急速に進歩している方法として血管内手術があります。これは「脳動脈瘤」内に特殊な（塞栓）物質を詰めて、脳動脈瘤の中の血液を固めてしまう方法です。</p> <p>〈N〉 局所または全身麻酔のもと、足の付け根の動脈からカテーテルという細い管を進めていきます。</p> <p>〈N〉 脳動脈瘤に到達したところでカテーテルの中からプラチナなどでできた特別なコイルをつめていきます。</p> <p>〈N〉 この手術法では、大きさが小さくネックが狭い動脈瘤では完全閉塞率が高く、大きな動脈瘤でネックが広い動脈瘤では不完全な閉塞となる可能性があります。</p>

28b	<p>【M R A】</p> <p>・塞栓物質で満たされた脳動脈瘤</p>	<p>〈N〉 また、治療後は数年の定期的な画像診断により閉塞の進行を確認する必要があります。</p>
29	<p>【合併症・偶発症・危険性】</p> <p>◆血管内手術に伴う合併症</p> <p>〈1〉手術手技に関するもの</p> <p>〈2〉全身麻酔、使用薬剤に関するもの</p> <p>〈1〉手術手技に関するもの</p> <p>[脳動脈瘤破裂によるくも膜下出血]</p> <p>[操作中の血管穿孔、血管解離などの血管損傷]</p> <p>[血液の固まりが脳へ流れる脳塞栓]</p> <p>[塞栓物質による血管閉塞]</p> <p>〈2〉全身麻酔、使用薬剤に関するもの</p> <p>[全身麻酔に伴う合併症]</p> <p>[抗凝固剤の使用による頭蓋内出血]</p>	<p>〈N〉 血管内手術に伴う合併症には、手術手技に関するもの、麻酔に関するものなどがあり、</p> <p>〈N〉 手術手技に関するものとして、脳動脈瘤破裂によりくも膜下出血を起こしたり、操作中に脳血管が損傷されて血管の壁に穴があいたり血管の壁が裂けたりすることがあります。また血液の固まりが脳の奥へ流れて脳塞栓を起こしたり、動脈瘤塞栓物質により親血管が閉塞して脳梗塞を起こすことがあります。</p> <p>〈N〉 その他、全身麻酔に伴う合併症や、抗凝固剤の使用による頭蓋内出血などがあります。</p>
30	<p>【重篤な合併症の発症率】</p> <p>・ [重篤な合併症 9% (Lancet 2003) 日本では4～5% (2004 脳外科総会)]</p>	<p>〈N〉 Lancet のデータによると、これらの重篤な合併症が起こる確率は 9%前後と報告されていますが、やはり施設により合併症が発生する率も異なります。日本での最近の脳外科学会では4-5%と報告されています。</p>
3-3 : 〈コーナータイトル〉 経過観察		
31	<p>【診察風景】</p> <p>・ 各種検査</p>	<p>〈N〉 3番目の治療選択として、日常生活に支障をきたす神経症状がない場合、脳動脈瘤の大きさ、形状、その経時変化、治療に伴う危険性などを十分に考慮して経過観察にとどめる場合もあります。</p>

3 2	<p>【治療対象の判断基準】</p> <p>[年齢60歳 平均寿命80歳-60=20年]</p> <p>[年間出血率1% (0.01)の動脈瘤]</p> <p>[生涯における出血の確率： =0.01×20=0.2 (20%)]</p> <p>[出血による重症化：50%]</p> <p>[生涯における重症化の確率： =0.01 × 0.5 × 20= 0.1 (10%)]</p> <p>[治療に伴う危険率≤10%→治療対象]</p>	<p>〈N〉例えば60歳で余命20年、年間出血率がおよそ1%の動脈瘤で考えた場合、生涯に脳動脈が破裂する確率はおよそ20パーセント。さらに出血した時に重症となる確率が50%とすると、生涯に重篤となる確率は10パーセントになります。</p> <p>〈N〉したがって、重篤な合併症が起こる危険率が10%より十分に低い場合には治療の対象になります。</p>
3-4 : 現段階の選択肢		
3 3	<p>【診察室：治療方針の決定】</p> <p>・医師の提示</p> <p>(2nd オピニオンを示唆)</p>	<p>〈医師〉伊藤さんの場合は、脳神経外科の専門がある病院であれば、開頭術による治療が可能であり、出血を防ぐことができます。治療に伴う危険性が低ければ開頭術を選択してもよいと考えています。ネックが小さいので血管内手術も可能かもしれません。</p> <p>〈伊藤さん〉こちらの病院でも治療は可能ですか。</p> <p>〈医師〉開頭術はこの病院でも可能ですが、血管内治療はしておりませんので、御希望なら他の病院を紹介しましょう。</p> <p>〈伊藤さん〉わかりました。しばらく考えてみます。</p>

4 : 治療方針の決定

3 4	【病院関連】
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	<ul style="list-style-type: none"> ・手術～待合など ・写真を見ながら診断する医師 ・医師と患者の会話 <p style="text-align: right;">など</p>	<p>〈N〉脳動脈瘤により出血率は一様ではなく、各施設で行われている治療方針、治療成績も異なりますので、担当医に十分に説明を受ける必要があります。また、破裂の危険性はあるものの時間的余裕もありますので異なる先生の意見を参考にするのもよいと思います。</p>
3 5	<p>【脳動脈瘤と危険因子】</p> <ul style="list-style-type: none"> ・大きさの違うものを並べて ・『家族歴』『喫煙歴』により上昇 	<p>〈N〉未破裂脳動脈瘤は成人で数％に発見され、家族歴、喫煙歴などにより発見率は上昇します。動脈瘤の大きさと出血率については、動脈瘤が大きいほど破裂する率が高いとされています。</p>
3 6	<p>【脳動脈瘤の大きさと出血率】</p> <p>年間出血率 (Lancet2003)</p> <ul style="list-style-type: none"> ・ 7mm 未満 : 0.1%/年 — ・ 7-12mm : 1.5% ↓ ・ 13-24mm : 2.7% ↓ ・ 25mm 以上 : 5.3% 治療 の対象 	<p>〈N〉出血率についての最近の欧米のデータでは、7 mm以上の動脈瘤の場合、年間出血率は1%を超え、25 mm以上では5%程度となっており、7 mm以上の脳動脈瘤は治療の対象としています。</p>
3 7	<p>【未破裂脳動脈瘤の出血率】</p> <p>【くも膜下出血の頻度】</p> <p> [人口 10 万人当り 10-20 人]</p> <p>【未破裂脳動脈瘤】</p> <p> [年間出血率 0.5-1%程度]</p>	<p>〈N〉一方、日本ではくも膜下出血の頻度は人口10万人当り10-20人で、欧米の2～3倍多いとされ、年間出血率は0.5-1%程度と見積もられています。</p>
37b	<p>【脳動脈瘤の部位と危険率】</p> <ul style="list-style-type: none"> ・動脈瘤の部位 ・動脈瘤の形 ・くも膜下出血の既往歴 ・家族歴 	<p>〈N〉また、部位としては中大脳動脈などの前方の動脈瘤は出血しにくく、脳底動脈などの後方の動脈瘤は出血率が高いとされています。大きさが5 mm 前後でも形がいびつなものは出血しやすいとされ、通常5 mm 以上のものは治</p>

<p>3 8 【治療対象の判断基準】</p> <ul style="list-style-type: none"> ・ 平均余命 ・ 年間出血率 ・ 出血による重症化 ・ 治療に伴う危険性 		<p>療を考慮することになっています。</p> <p>〈N〉 また、年齢については、若いほど生涯にわたる出血の可能性が高くなり、60代前半までは平均余命、年間出血率、出血による重症化、治療に伴う危険性などを考え、積極的な治療の対象となりますが、70歳を超える場合は慎重な対応が必要です。</p>
<p>3 9 【治療に伴う費用と入院日数】</p> <ul style="list-style-type: none"> ・ 開頭術 200万円 2～3週間 ・ 血管内手術 2～300万円 2～3週間 		<p>〈N〉 各治療に必要な費用、入院日数については、動脈瘤の大きさや部位により異なりますが、現在のところ概ね2つの治療法については大きな差はないようです。</p>
<p>4 0 【診察室】</p> <ul style="list-style-type: none"> ・ 手術の説明を受ける伊藤さんと医師の会話でEND 		<p>〈N〉 各術式の具体的な方法と治療成績、治療に伴う合併症などについては各担当の先生に、十分納得いくまで説明を聞いてください。</p>

5：症例集

5-1：Case 1・開頭術が可能なケース

<p>4 1</p> <p>[55歳（男性） 前交通動脈動脈瘤]</p> <p>[形状:いびつ(プレブを伴う) 大きさ:最大径5mm 既往歴、家族歴なし]</p> <p>[年間出血率1%（日本） → 年齢、形状から治療の対象]</p>		<p>〈N〉 これは55歳・男性、前交通動脈動脈瘤のケースです。最大径5mmと小さめですが、形はややいびつでプレブを伴っています。くも膜下出血の既往や家族歴はありません。</p> <p>〈N〉 最近の欧米のデータでは年間出血率が0.1%以下と低く、経過観察を薦めていますが、日本からの報告では出血率は1%前後であり、また他の部位よりやや高いと考えられ</p>
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		<p>ています。</p> <p>〈N〉 年齢が比較的若く、ブレブを伴っており、合併症が十分低ければ治療の対象と考えてよいと思われます。日本では通常開頭術が行われていますが、開頭術、血管内手術の選択については、治療効果、施設の方針、技量などをよく検討して行う必要があります。</p>
5-2: Case 2・血管内手術が可能なケース		
4 2	<p>[65歳(女性) 脳底動脈先端部の動脈瘤]</p> <p>[形状:なめらか 大きさ:最大径10mm 過去に他の動脈瘤からの出血歴あり]</p> <p>[年間出血率3% → 部位・くも膜下出血歴から治療の対象]</p>	<p>〈N〉 これは65歳の女性、脳底動脈先端部動脈瘤のケースです。形はなめらかですが最大径10mmと中等度の大きさです。</p> <p>〈N〉 最近の欧米のデータでは年間出血率が3%程度と考えられ、過去に他の動脈瘤から出血したことがあるため、治療の対象とするのが妥当と思われます。動脈瘤がかなり高い位置にあるため、開頭術に伴う合併症、年齢などを考えて血管内手術を試みてもよいと思われます。</p>
5-3: タイプ3・経過観察が可能なケース		
4 3	<p>[50歳(女性) 中大脳動脈動脈瘤]</p> <p>[形状:なめらか 大きさ:最大径4mm 既往歴、家族歴なし]</p> <p>[年間出血率0.1%以下 → 当面は画像による経過観察]</p>	<p>〈N〉 これは50歳の女性、中大脳動脈動脈瘤のケースです。右下最大径4mmと小さく、形はなめらかで、くも膜下出血の既往や家族歴の既往はありません。</p> <p>〈N〉 欧米のデータに基づいて、年間出血率が0.1%以下とすると当面は画像による経過観察でもよいと判断されます。ただし、形の変化や増大傾向が認められれば治療の対象となります。</p>

クレジット	
	企画：厚生労働省循環器疾患等総合研究事業 制作：NHKソフトウェア

研究成果の刊行に関する一覧表

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Inadequate Website Disclosure of Surgical Outcome of Intracranial Aneurysms

—Survey of 1225 Sites in Japan—

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Abstract

Social demand for the disclosure of medical information is increasing, especially the treatment for unruptured intracranial aneurysms. This study investigated to what extent information on the treatment for unruptured intracranial aneurysms is disclosed on websites in Japan. We surveyed 1225 institutions authorized by The Japan Neurosurgical Society. The following factors were analyzed: percentage of institutions with websites, disclosure of number of surgeries, and disclosure of outcome of treatment for ruptured and unruptured intracranial aneurysms. Of the 1225 institutions surveyed, 1097 (89.6%) had their own websites. The total number of websites was 1262 since some institutions have several homepages in different websites. The annual number of surgeries was shown in 274 of the 1225 institutions (22.4%). The outcome of treatment for ruptured intracranial aneurysms was disclosed in 104 of the 1225 institutions (8.5%). The outcome of treatment for unruptured intracranial aneurysms was shown in only 32 of the 1225 institutions (2.6%). Disclosure of outcome of treatment for unruptured intracranial aneurysms on websites is not common. To improve disclosure of the outcome on websites, guidelines should be established.

Key words: Internet, unruptured intracranial aneurysm, outcome

Introduction

The disclosure of medical information has become one of the most significant issues for the public. This disclosure involves a wide range of information, including both basic medical science and medico-social problems such as medical liability issues and medical accidents. Information on the outcome of the treatment is the most important for the public, since it is directly related to the behavior and decision-making of the patients. In particular, individual data on specific hospitals and physicians is useful for patients to select a hospital and physician.

The World Wide Web is becoming the most convenient source of healthcare information due to the remarkable development of the Internet and information technology.^{1,23,28,30,33} This medium directly provides anonymous access to the most recent information anywhere at anytime. For general information on health care such as definition of diseases and explanation of treatments, disclosure is

comparatively simple and straightforward.^{19,27} However, disclosure of outcome of treatment involves many complicated problems.^{7,11,12,15,29}

In this study, the disclosure of outcome of treatment for intracranial aneurysms in Japan was extensively analyzed based on data on the websites of 1225 institutions authorized by The Japan Neurosurgical Society. This is the first study investigating the extent of the disclosure of outcome of treatment for intracranial aneurysms on websites.^{13,18,35}

Subjects and Methods

I. Subjects

Most intracranial aneurysms are treated in hospitals authorized by The Japan Neurosurgical Society. There are 1225 hospitals registered by The Japan Neurosurgical Society (home page, <http://jns.umin.ac.jp/>) in October 2003. Briefly, the requirement for this authorization is that total number of surgeries has to exceed 100 cases per year and there should be more than two neurosurgeons qualified by The Japan Neurosurgical Society.

To survey the extent of disclosure of information

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Table 1 Database on Excel file

Number	Institution	District	Website	URL	Number of surgeries*	General outcome*	Aneurysm outcome*	
							Ruptured	Unruptured
1	Asahikawa Med. Univ.	Hokkaido	○	http://www.asahikawa-med.ac.jp/dept/mc/neuro/	×	△	△	△
2	Hokkaido Univ.	Hokkaido	○	http://www.med.hokudai.ac.jp/~neusur-w/	×	×	×	×
3	Sapporo Med. Univ.	Hokkaido	○	http://web.sapmed.ac.jp/nsurg/	×	×	△	×
4	Akita Univ.	Akita Pref.	○	http://www.hos.akita-u.ac.jp/	×	×	×	×
5	Iwate Medical Univ.	Iwate Pref.	○	http://www.iwate-med.ac.jp/univ/kouza/nouge.html	×	×	×	×
6	Tohoku Univ.	Miyagi Pref.	○	http://www.hosp.tohoku.ac.jp/	×	△	×	×
7	Yamagata Univ.	Yamagata Pref.	○	http://www.id.yamagata-u.ac.jp/NeuroSurge/NeuroS-j.html	×	×	×	×
8	Fukushima Univ.	Fukushima Pref.	○	http://www.fmu.ac.jp/home/ins/index-j.html	×	×	△	×

Only the first eight academic websites of 1225 institutions are shown. * ×: no data, △: outline, ○: detail data. Med.: Medical, Pref.: Prefecture, Univ.: University.

by these 1225 hospitals, their websites were searched using the Internet search engines Yahoo! and Google. This survey was performed from May 2004 to June 2004.

II. Investigated items

Percentage of institutions with websites: The percentage of institutions with websites was examined. Some institutions had two or more homepages (one homepage included in the website of the main institution and another independent homepage). In such cases, the websites were considered as one.

Disclosure of number of surgeries: Disclosure of the annual number of surgeries was examined.

Disclosure of outcome of treatment for ruptured intracranial aneurysms: Whether outcome of treatment for ruptured intracranial aneurysms was disclosed or not was examined.

Disclosure of outcome of treatment for unruptured intracranial aneurysms: Whether outcome of treatment for unruptured intracranial aneurysms was disclosed or not was examined.

The enormous amount of data obtained from these websites of more than 1000 institutions was analyzed in an Excel spreadsheet (Microsoft Co., Redmond, Wash., U.S.A.) as shown in Table 1.

III. Additional analysis

Many interesting questions can be answered based on the vast database of information on the websites of these 1225 institutions. The following three questions were investigated.

Firstly, we considered whether urban institutions located in densely populated and competitive areas may disclose their outcome more than those located in underpopulated areas. To answer this question, the Tokyo metropolitan area as a sample of a densely populated area and the Hokkaido area, exclusive of Sapporo, as a sample of an underpopulated area were selected. The second question is whether academic institutions, such as university hospitals, disclose their outcomes more than other institutions. Finally, we speculated that high-volume hospitals disclose their outcome more than low-volume hospitals. Therefore, the third question is whether institutions that disclose outcomes on their websites have a greater number of surgeries compared to those that do not.

Initially we planned to analyze the outcome data, including mortality and morbidity of unruptured aneurysm treatment in Japan, based on the data obtained from websites. However, not enough quantitative data was obtained from the websites as disclosed in this paper.

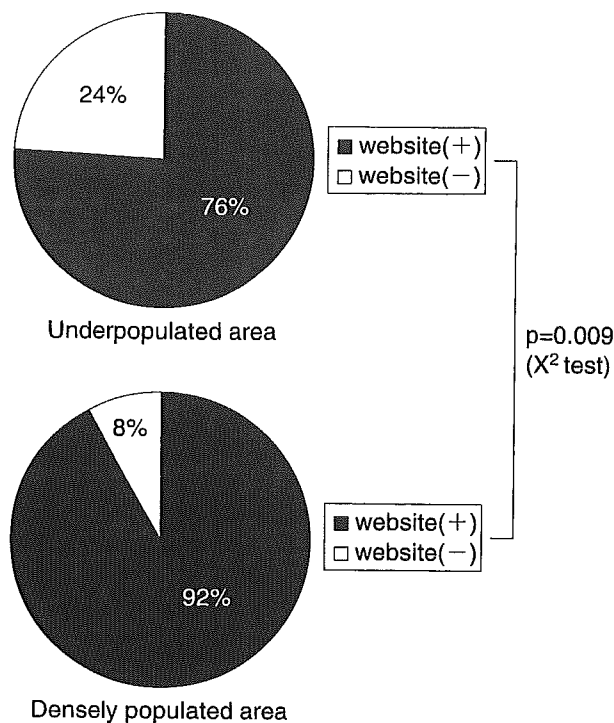


Fig. 1 More institutions have websites in the Tokyo area (densely populated and competitive area) as compared to the Hokkaido area (underpopulated area) ($p = 0.009$, chi-square test).

Results

I. Main analysis

Percentage of institutions with websites: Out of 1225 institutions, 1097 (89.6%) had their own homepage. The total number of websites was 1262 since some institutions have several homepages in different websites.

Disclosure of number of surgeries: Among these 1225 institutions, the annual number of surgeries was disclosed in only 274 websites (22.4%).

Disclosure of outcome of treatment for ruptured intracranial aneurysms: Among the 1225 institutions, outcome of treatment for ruptured intracranial aneurysms was disclosed in 104 websites (8.5%).

Disclosure of outcome of treatment for unruptured intracranial aneurysms: The outcome of treatment for unruptured intracranial aneurysms was disclosed in only 32 websites (2.6%).

II. Additional analysis

Comparison between densely populated and underpopulated areas (Fig. 1): There were 68 institutions (27 "A ranked" and 41 "C ranked" hospitals)

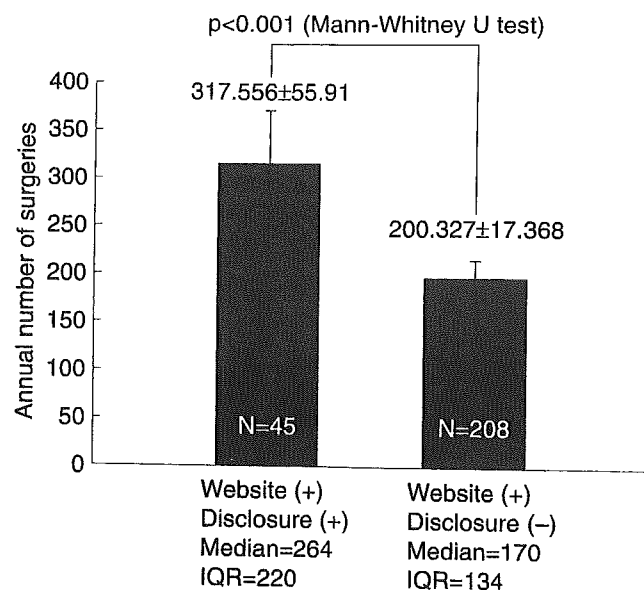


Fig. 2 Number of surgeries (annual number) was compared between the institutions that disclosed their outcome data and those that did not. Institutions that disclose their outcome had a significantly larger number of annual surgeries than those that did not. Values are given as mean \pm SD ($p < 0.001$, Mann-Whitney U test). Median value was 264 and 170 and interquartile range (IQR) was 220 and 134, respectively.

in the Tokyo area (23 districts) and 57 institutions (29 "A ranked" and 28 "C ranked" hospitals) in the Hokkaido area. There is no significant difference between the Tokyo and Hokkaido areas in the density of the neurosurgical institutions per unit population. However, the institutions in the Tokyo area had a greater percentage of websites (92%) compared to the Hokkaido area (76%) ($p = 0.009$, chi-square test).

Comparison between academic and other institutions: All academic institutions had websites (100%). This was significantly higher than other general neurosurgical institutions (84.0%) ($p < 0.001$, chi-square test). However, the content on the academic institution websites was not always satisfactory since disclosure of the annual number of surgeries was only 10% and disclosure of outcome of treatment for ruptured and unruptured aneurysms were 7% and 3%, respectively.

Disclosure of outcome of treatment for unruptured intracranial aneurysms as related to number of surgeries (Fig. 2): A significant difference was seen between 45 institutions that disclosed outcome of treatment for unruptured intracranial

aneurysms on their websites and 208 institutions that do not based on the annual number of surgeries (mean \pm SD, 317.556 ± 55.91 and 200.327 ± 17.368 , median, 264 and 170, interquartile range, 220 and 134, respectively; $p < 0.001$, Mann-Whitney U test). Larger volume hospitals tended to disclose the outcome on websites.

Discussion

The brain check-up system called "Brain Dock" is well developed in Japan. People who want to check for asymptomatic cerebral infarction and unruptured aneurysm can select hospitals that provide the "Brain Dock." The "Brain Dock" includes both imaging examinations such as brain magnetic resonance (MR) imaging, neck vascular imaging using MR angiography, and/or Doppler ultrasonography, and general medical checks such as blood examination, blood pressure, and other options. There are requirements for the quality of imaging regulated by the Japanese Society for Detection of Asymptomatic Brain Diseases (homepage, <http://www.snh.or.jp/jsbd/>).

The spread of this system has affected Japanese society, including the diagnosis of unruptured intracranial aneurysms in healthy people and treatment to prevent subarachnoid hemorrhage. Unruptured intracranial aneurysms have been identified in more than 6% of people who underwent the "Brain Dock" using high quality MR angiography.²⁶⁾

The Japanese Society for Detection of Asymptomatic Brain Diseases recommends that the outcome should be disclosed in the homepage of each hospital (<http://www.snh.or.jp/jsbd/>). The present study has shown that this advice has been not followed. Necessary information for patients who have unruptured intracranial aneurysm identified by the "Brain Dock" is not well disclosed on websites. Websites that offer information on the outcome of treatments are not common. While patients can directly ask physicians in the outpatient clinic for general information on unruptured intracranial aneurysms, it is not always easy to ask directly about the outcome of treatment. Other sources such as "Guide of Best Hospitals" and "Guide of Best Doctors" do not always provide correct information.^{6,9,22)} Therefore, websites are an important source of information for patients, since it is easy to access and the cost is low. On the Internet, patients can see the outcomes and strategies of other hospitals. However, our results revealed that this important source of information is not widely available.

Unruptured intracranial aneurysm is not a newly

established disease, but has been one of the most important diseases for neurosurgeons for a long time. However, the swift spread of high resolution MR angiography revealed an unexpectedly high incidence of unruptured intracranial aneurysms in healthy people.^{4,26)} This disease has provoked controversy among medical professionals and the public. The natural history of unruptured intracranial aneurysms also remains controversial, and is still under investigation.^{5,14,16,20,34)} Discussion of the rupture rate of intracranial aneurysms is being debated in many journals.^{3,8,10,17,24,25,32)} Guidelines for the treatment of unruptured intracranial aneurysms have not been firmly established.³¹⁾ Moreover, many medical malpractice suits related to the treatment of unruptured intracranial aneurysms have been reported.²⁾

Therefore, the public is interested in obtaining updated information about this disease. In particular, patients with unruptured intracranial aneurysm and their families seriously search for both general information of this disease and individual outcome data of each institution. Among the many sources of information the World Wide Web gives patients and professionals easy access to up-to-date data of individual institutions. Indeed, many papers report that the Internet is becoming the most important source of information for patients.^{1,28,30,33)}

On the other hand, outcome disclosure is not easy from the viewpoint of hospitals and physicians that are subject to disclose information to the public. Complicated problems arise when information about medical outcomes are disclosed. For example, if no guidelines for the disclosure of medical outcome on the Internet exist, physicians may be hesitant to do so.^{11,12,29)} In addition, outcome evaluation in surgery is also controversial.²¹⁾ There is no gold standard to evaluate outcome of treatment for unruptured intracranial aneurysms. In addition, some data may be involved in ongoing lawsuits or medical liability cases. Even in the absence of legal problems, institutions may hesitate to publish their data, unless the outcomes have been excellent. In addition, since each institution and any individual can set up a homepage without restriction or control, there is a risk of deliberate modification of data. It is easy to spread biased information for commercial purposes on the Internet.³⁰⁾

The present study revealed that only 2.6% of 1225 institutions in Japan disclosed outcome data of treatment for unruptured intracranial aneurysms on websites. This number is lower than we had expected when we launched this study. In other words, at present it is practically impossible for patients to obtain data on unruptured intracranial aneurysms

from individual institutions using the Internet. This problem does not seem to be specific to Japan, although there is no international comparative study on websites of medical information. Surgery for unruptured aneurysms is likely to increase in Europe, North America, and Korea. To provide the best information to patients, the creation of the websites is important. For this purpose, we need to establish minimum guidelines and ethics for the disclosure of outcome on websites.

There is no question that establishment of the appropriate guidelines is indispensable for improved treatment for unruptured intracranial aneurysms. However, at present, we do not have any reliable or scientific standards to compare the complicated outcome of such treatment. It is true that the outcome is seriously affected by the expertise of surgeons and endovascular surgeons. However, other factors such as the characteristics of the patient including the aneurysm size, location, and risk factors are strongly related to the outcomes. In other words, simple exposure of the outcome without adequate guidelines may invoke unfair interpretation of the competence of hospitals and neurosurgeons. In order to prevent this unfavorable trend, the establishment of adequate guidelines based on the peer review system is required without delay.

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Risk of rupture associated with intact cerebral aneurysms in the Japanese population: a systematic review of the literature from Japan

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Object. Knowing the rate of rupture associated with unruptured cerebral aneurysms (UCAs) can help surgeons determine a case management strategy in patients harboring these lesions. According to large-scale cohort studies involving populations in North America and Europe, small unruptured aneurysms carry a very low risk of rupture. In Japan, however, there have been sporadic reports of higher rates of rupture. To identify the rupture risk associated with UCAs in the Japanese population, the authors systematically reviewed retrospective studies of the natural course of these lesions.

Methods. The authors searched Medline and the Japan Medical Abstract Society Index for reports of UCAs in Japan. Two of the authors verified the eligibility of the reports and extracted data independently. Additional information was directly obtained from the authors of the original reports.

Thirteen reports covering a total of 3801 patient-years fulfilled the criteria for our study. Subsequent rupture was documented in 104 patients and the annual rupture rate was 2.7% (95% confidence interval 2.2–3.3%). Large, posterior-circulation, and symptomatic aneurysms were associated with significantly higher rates of rupture (relative risks 6.4, 2.3, and 2.1, respectively). The risk of rupture determined by the authors' review was significantly higher than that reported by investigators from international cohort studies.

Conclusions. Although a selection bias of patients may be the cause of the higher rupture risk, untreated UCAs that have been followed in Japanese institutions have a considerably high rate of rupture. The natural course of UCAs should be carefully estimated in countries not included in the international studies.

KEY WORDS • unruptured aneurysm • natural history • aneurysm rupture • population study

RECENT reports from large-scale retrospective and prospective cohort studies have concluded that the risk of rupture associated with small UCAs is extremely low. These studies included data primarily from Caucasian populations (> 90% of patients) in North America and Europe.^{11,12} The clinical behavior of UCAs is known to vary according to characteristics such as patient sex and age, size and location of the aneurysm, and other factors.^{11,13,22} We believe that the genetic background of race should also be incorporated into an analysis of the rupture risk associated with UCAs. Although some investigators have considered variations in the rate of SAH according to race or nation,^{1,4,9} few have addressed racial differences in the rupture risk associated with UCAs. Several retrospective series documented a high risk of rupture among UCAs in Japan and Finland;^{13,26,27} however, because these studies included only limited numbers of patients, they cannot be compared with large-scale cohort studies. To clarify the rupture risk among untreated UCAs in Japan and to determine whether

this risk differs from that shown in international studies, we systematically reviewed the literature on the natural history of UCAs published exclusively by Japanese institutions.

Clinical Material and Methods

Inclusion Criteria

To locate studies of the natural course of UCAs published by Japanese institutions from 1980 to 2003, we searched Medline from 1981 onward and the Index of the Japan Medical Abstract Society from 1983 onward. We also searched reference lists of all relevant publications for additional studies. Two authors (A.M. and S.F.) independently evaluated each study to assess its eligibility for this review. The following inclusion criteria were used. 1) The study was performed in a Japanese institution and reported in a peer-reviewed journal in either English or Japanese. 2) Each study included at least 10 patients with unruptured aneurysms, and the exact number of cases and mean follow-up periods were documented. 3) The number of patients presenting with SAH or aneurysm-related symptoms was available. 4) In cases presenting with SAH in which additional aneurysms were present, the ruptured aneurysm had

Abbreviations used in this paper: CI = confidence interval; ISUIA = International Study of Unruptured Intracranial Aneurysms; OR = odds ratio; RR = relative risk; SAH = subarachnoid hemorrhage; UCA = unruptured cerebral aneurysm.